A SUPPLEMENT TO COMPUTERWORLD

COMPUTERWORLD Extra

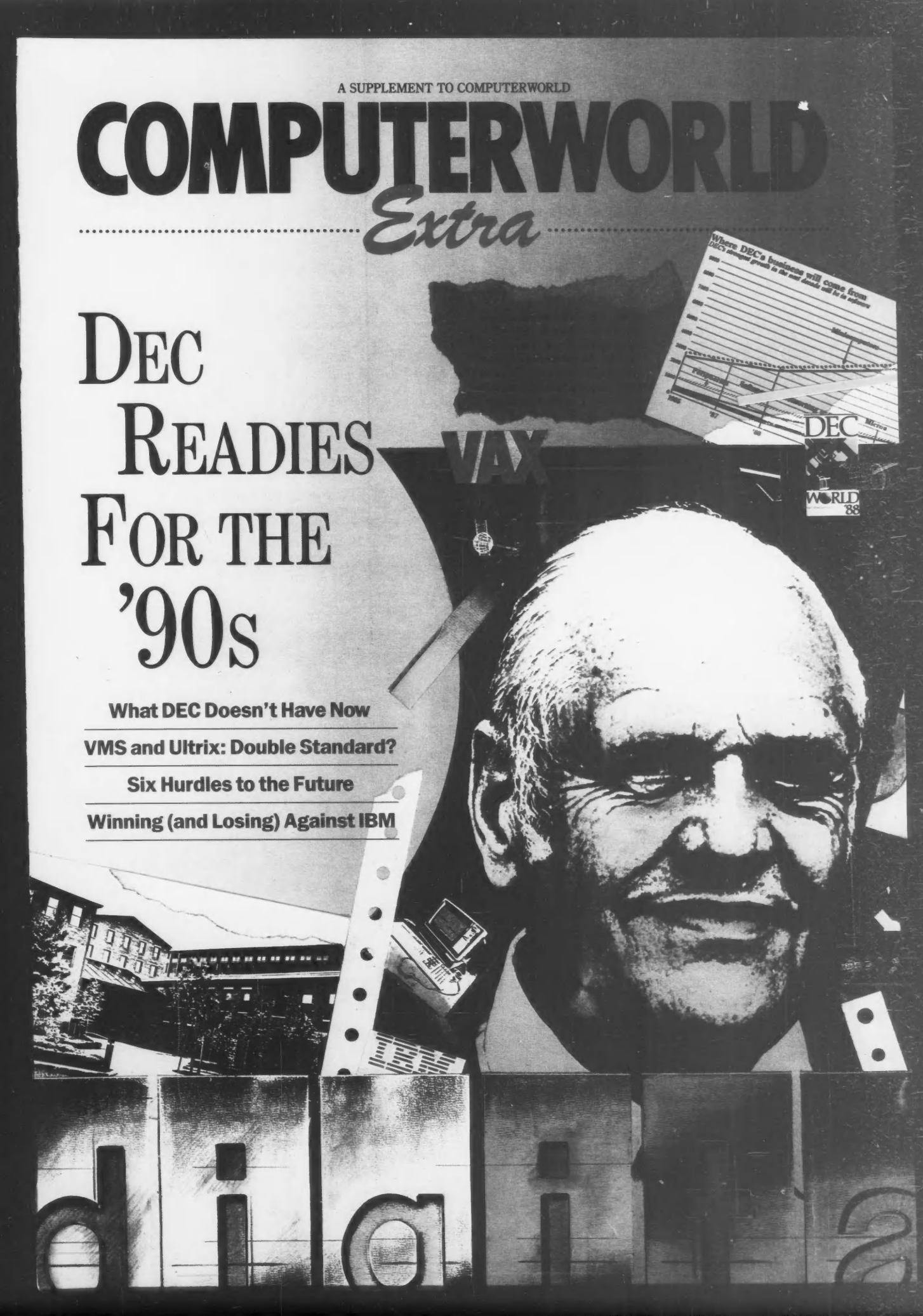
DEC READIES FOR THE '90S

What DEC Doesn't Have Now

VMS and Ultrix: Double Standard?

Six Hurdles to the Future

Winning (and Losing) Against IBM



PowerHouse®

5 POWERFUL NEW REASONS NOT TO MISS BOOTH 1420 AT DEXPO WEST!

- Cognos introduces PowerHouse StarBase™, the industry's most advanced **RDBMS**.
- PowerHouse expands its flexibility with a bridge to **20/20®**.
- PowerHouse and DB/ACCESS give you access to **data on IBM mainframes**.
- **PowerHouse ARCHITECT** ™ provides a blueprint for building better applications.
- **PowerHouse PC** ™ allows full application development under DOS or OS/2 ™, and full communication with your VAX®.

You've made PowerHouse the industry's leading fourth-generation language.
Now discover how PowerHouse integrates with other world-class technologies.

COGNOS®

Cognos Corporation, 2 Corporate Place, I-95, Peabody, MA 01960, USA, (508) 535-7350, CognosDirect: (800) 1-800-426-4667, Fax: (508) 535-1328, Cognos Incorporated, 3755 Riverside Drive, P.O. Box 9707, Ottawa, Ontario, Canada, K1G 3Z4 (613) 738-1440, CognosDirect: (800) 267-2777, Fax: (613) 738-0002. Cognos Limited, Westerly Point, Market Street, Bracknell, Berkshire RG12 1QB, U.K. National (0344) 486668, International +44 344 486668, Fax: 0344 485124.

Cognos and PowerHouse are registered trademarks of Cognos Incorporated. PowerHouse ARCHITECT and PowerHouse PC are trademarks of Cognos Incorporated. OS/2 is a trademark of International Business Machines. 20/20 is a registered trademark of Access Technology Inc. VAX is a registered trademark of Digital Equipment Corporation.

Circle Reader Service Number 1

Pass along readers, unite!

Demand your own copy of Computerworld.

YES, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $44* per year — saving over 56% off the single copy price. In addition, as a subscriber, I understand I will receive bonus issues of COMPUTERWORLD FOCUS at no extra charge.

First Name MI Last Name

Title Company

Address

City State Zip

Address Shown: ☐ Home ☐ Business Single Copy Price: $2.00

* U.S. Only. Canada, Central America & South America $110/Europe $165. All countries $245 (Airmail). Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

1. **BUSINESS/INDUSTRY** (Circle one)
   - 10. Manufacturer (other than computer)
   - 20. Finance/Insurance/Real Estate
   - 30. Medicine/Law/Education
   - 40. Wholesale/Retail Trade
   - 50. Business Service (except DP)
   - 60. Government — State/Federal/Local
   - 65. Communications Systems/Public Utilities/ Transportation
   - 70. Mining/Construction/Petroleum/Refining/Agric.
   - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85. Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
   - 90. Computer/Peripheral Dealer/Distributor/Retailer
   - 75. User: Other _____
   - 95. Vendor: Other _____ (Please specify)
2. **TITLE/FUNCTION** (Circle one)
   IS/MIS/DP MANAGEMENT
   - 10. Vice President, Asst. VP
   - 21. Dir., Mgr., Suprv., IS/MIS/DP Services
   - 22. Dir., Mgr., Suprv., of Operations, Planning, Adm. Services
   - 23. Dir., Mgr., Suprv., Analyst, of Systems
   - 31. Dir., Mgr., Suprv., of Programming
   - 32. Programmer, Methods Analyst
   - 33. Dir., Mgr., Suprv., OA/WP
   - 38. Data Comm. Network/Systems Mgt.

   OTHER COMPANY MANAGEMENT
   - 11. President, Owner/Partner, General Mgr.
   - 12. Vice President/Asst. VP
   - 13. Treasurer, Controller, Financial Officer
   - 41. Engineering, Scientific, R&D, Tech. Mgt.
   - 51. Sales/Mktg. Mgt.

   OTHER PROFESSIONALS
   - 60. Consulting Mgt.
   - 70. Medical, Legal, Accounting Mgt.
   - 80. Educators, Journalists, Librarians, Students
   - 90. Others _____ (Please specify)
3. **COMPUTER INVOLVEMENT** (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant.
   - A. Mainframes/Supermins
   - B. Minicomputers/Small Business Computers
   - C. Microcomputers/Desktops
   - D. Communications Systems
   - E. Office Automation Systems
   - F. No Computer Involvement

E480X-7

Pass along readers, unite!

Demand your own copy of Computerworld.

YES, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $44* per year — saving over 56% off the single copy price. In addition, as a subscriber, I understand I will receive bonus issues of COMPUTERWORLD FOCUS at no extra charge.

First Name MI Last Name

Title Company

Address

City State Zip

Address Shown: ☐ Home ☐ Business Single Copy Price: $2.00

* U.S. Only. Canada, Central America & South America $110/Europe $165. All countries $245 (Airmail). Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

1. BUSINESS/INDUSTRY (Circle one)
   - 10. Manufacturer (other than computer)
   - 20. Finance/Insurance/Real Estate
   - 30. Medicine/Law/Education
   - 40. Wholesale/Retail Trade
   - 50. Business Service (except DP)
   - 60. Government — State/Federal/Local
   - 65. Communications Systems/Public Utilities/ Transportation
   - 70. Mining/Construction/Petroleum/Refining/Agric.
   - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85. Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
   - 90. Computer/Peripheral Dealer/Distributor/Retailer
   - 75. User: Other _____
   - 95. Vendor: Other _____ (Please specify)
2. TITLE/FUNCTION (Circle one)
   IS/MIS/DP MANAGEMENT
   - 10. Vice President, Asst. VP
   - 21. Dir., Mgr., Suprv., IS/MIS/DP Services
   - 22. Dir., Mgr., Suprv., of Operations, Planning, Adm. Services
   - 23. Dir., Mgr., Suprv., Analyst, of Systems
   - 31. Dir., Mgr., Suprv., of Programming
   - 32. Programmer, Methods Analyst
   - 33. Dir., Mgr., Suprv., OA/WP
   - 38. Data Comm. Network/Systems Mgt.

   OTHER COMPANY MANAGEMENT
   - 11. President, Owner/Partner, General Mgr.
   - 12. Vice President/Asst. VP
   - 13. Treasurer, Controller, Financial Officer
   - 41. Engineering, Scientific, R&D, Tech. Mgt.
   - 51. Sales/Mktg. Mgt.

   OTHER PROFESSIONALS
   - 60. Consulting Mgt.
   - 70. Medical, Legal, Accounting Mgt.
   - 80. Educators, Journalists, Librarians, Students
   - 90. Others _____ (Please specify)
3. COMPUTER INVOLVEMENT (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant.
   - A. Mainframes/Supermins
   - B. Minicomputers/Small Business Computers
   - C. Microcomputers/Desktops
   - D. Communications Systems
   - E. Office Automation Systems
   - F. No Computer Involvement

E480X-7

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

COMPUTERWORLD
Extra!

Editor
George Harrar
Senior Editor
Glenn Rifkin
Managing Editor
Steven M. Ulfelder
Assistant Managing Editor
Mary Grover
Art Director
Nancy Kowal
Copy Editors
Cathleen A. Duffy
Richard R. Pastore
Donald St. John
Joyce Chutchian
Graphics Editors
Frank C. O'Connell
Amy J. Swanson

Advertising Coordinator
Paula Shaughnessy
Production Director
Leigh Hometh
Assistant Production Director
Carol Polack
Production Manager
Beverly Wolff
Paste-Up Manager
Peter M. Kelly

Computerworld Editor in Chief
Bill Laberis
Computerworld Executive Editor
Paul Gillin

Copyright 1987 by CW Publishing/Inc. All rights reserved.
Computerworld can be purchased on 35mm microfilm through University Microfilm International Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106.
Photocopy rights: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Publishing/Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, MA 01970. Reprints (minimum of 100) and permission to reprint may be purchased from Nancy M. Shannon, CW Publishing/Inc., 375 Cochituate Road, Box 9171. Single reprints available from University Microform International only. Back issues may be purchased by calling (800) 669-1002.

ADVERTISERS INDEX

Cincom Systems, Inc. 20,21
800-543-3010;513-661-6000
Cognos Inc. C2
800-4-COGNOS;
800-267-2777 in CN
Compuserve Data Technologies 27,29,31
617-661-9440
Cortex Corporation 28
617-894-7000
Cullinet Software, Inc. 2-3
800-551-4555
CW Circulation C3
508-879-0700

Digital Equipment Corporation 16-17

McCormack & Dodge Corporation C4
800-343-0325
Miltope Business Products, Inc. 30
516-756-7650

Persoft, Inc. 22
608-273-6000

Raxco, Inc. 12
301-258-2620

Software AG 13
800-843-9534;703-860-5050

Texas Instruments 5
800-527-3500

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

CONTENTS

COLUMNS

WHAT DEC DOESN'T HAVE NOW By Amy Wohl 4
A SLOW, STEADY CLIMB By Jean Orr 32

INTERVIEW

FROM WALL STREET TO SNAKE OIL — OLSEN SPEAKS OUT By Glenn Rifkin and George Harrar 19

DEC VIEWS

WILLIAM STRECKER 8
ROSE ANN GIORDANO 18
WILLIAM JOHNSON 27
PETER SMITH 31

FEATURES

RACING INTO THE '90s By Dale Kutnick 6
DOUBLE STANDARD OR DOUBLE-TALK? By Donald C. Bellomy ..10
RHETORIC ASIDE, THE BATTLE RAGES By Stanley Gibson 15
IN A VAX WORLD, PDP-11 SOLDIERS ON By Alan Radding 23
KEEPING R&D IN THE HERE AND NOW By Avery Jenkins 25
DEC'S IDEA SEEKERS By Glenn Rifkin 26
FALOTTI PREDICTS DEC SURGE IN EUROPE By Amiel Kornel ...28

PRODUCTS

CHARTING THE CHANGES By Susan Greco 29

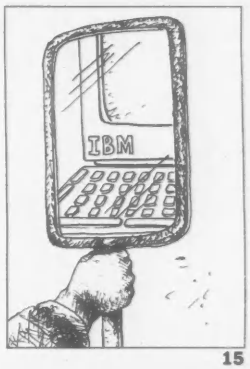
USER VIEWS

H. W. HOWARD 9
MICHAEL J. SEIDEN 12
CLAIR GOLDSMITH 14

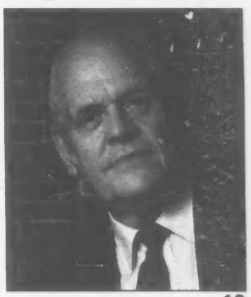
Cover illustration by Karen Watson

4

11



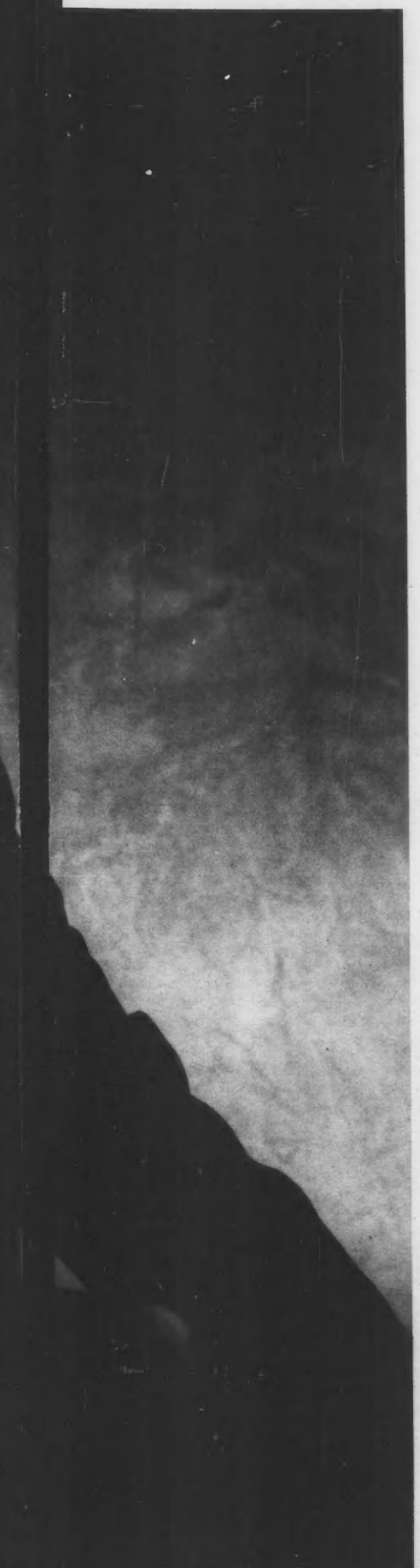
15


19

32

The powers that be on the new power in VAX® software.

VAX is a registered trademark of the Digital Equipment Corporation. RMS, SQL and Knowledge BUILD are trademarks of Cullinet Software, Inc.



The power to make or break products in the computer industry begins with a few powerful people. Consultants. And analysts. When they talk, we listen.

On IDMS/SQL: "Cullinet has delivered as promised—a relational database management system for the DEC VAX with superior performance, reliability and security."
—Charlotte Walker

On KnowledgeBUILD: "What vendors offer in the way of development tools, is in my mind, an increasingly important distinction. Cullinet is in the front of the pack on performance, but it's the power and sophistication of their KnowledgeBUILD toolset that gives them the edge for tomorrow."
—Michael Braude

On VAX and mainframe connectivity: "A clear demonstration that Cullinet now offers not only a powerful database and a rich development environment for the VAX, but also an architecture that permits a simple transparent exchange of data between a mainframe and VAX."
—Charlotte Walker

On the future: "Cullinet has given us a good example of strategic product development. I expect they will shortly evolve this architecture to the point where it is CPU independent. And they will be able to port it from the VAX to any other platform with full power and functionality intact."
—Michael Braude

In the race for greater performance and productivity, you can't afford to settle for less for your VAX than the most powerful database and tools available: IDMS/SQL and KnowledgeBUILD.

Faster than the competition. Able to build on each other without compromising efficiency or flexibility. Giving you a product you can build on. And on. And on.

Just ask the most powerful people in the business.

Or write Cullinet Software, Inc., Marketing Services, 400 Blue Hill Drive, Westwood, MA 02090-2198.

Call Cullinet today about an IDMS/SQL Seminar near you. 1-800-551-4555.

Cullinet®
The power to build on.

Charlotte Walker, V.P., County NatWest Securities, U.S.A.

H. Michael Braude, V.P. and Director, Software Management Strategies, Gartner Group, Inc.

Comment

BY AMY WOHL

What DEC Doesn't Have Now

When things go so smoothly for so long, even longtime underdogs can grow complacent. Industry analysts have been waiting for DEC to stub its toe on something — anything.

Last fall, in the glare of Decworld — the largest single-vendor computer event ever held — it was hard to see the cracks. The flaws were few and small. This year, especially as we look off into the 1990s, the questions seem plainer and the answers less so.

The biggest philosophical hole in DEC's product strategy sits on the desk top. In its heart of hearts (or in Ken Olsen's heart, to cite the conventional wisdom), DEC doesn't really believe that the proper front end to a VAX is a personal computer. The millions upon millions of IBM PCs and Apple Macintoshes are to DEC simply a side issue, a failure by users to understand the Right Stuff.

DEC has failed on a number of occasions to bring out a competitively featured, competitively priced PC workstation, and no new personal computer from DEC seems in sight. DEC is expected to bring out a less expensive VMS-on-the-desk machine, the so-called Pvax, and there is some speculation that such a machine might include PC capabilities as well. We suspect such a machine would be exciting to DEC aficionados — but of much less interest to most users, who simply seek high function and high PC compatibility at competitive prices.

DEC does sell lots of workstations. Henry Ancona, DEC vice-president of business and office information systems, proudly claims that DEC is the No. 2 vendor in that market.

But the workstation market is very small, compared with the personal computer market. Many believe that as high-end PCs (including Macintoshes) overlap workstations in function while offering lower prices, access to much more software and standard interfaces to large numbers of peripherals, the workstation market will itself be largely swallowed up by PC technology.

There are several problems here: Real Computer Users do use PCs, and those PCs don't come from DEC.

The processing power of personal computers is getting so cheap that it's hard to offer comparable power and performance, at competitive prices, at the end of a terminal cable. It is particularly tough to match PC power when you're running on an operating system built before the days of highly interactive, user-friendly interfaces and cycle-jarring personal productivity applications like spreadsheets and what-you-see-is-what-you-get word processors.

Nevertheless, DEC believes in terminals — it reportedly sold more than 500,000 last year — and another round of higher function terminals is where DEC is headed. Bit-mapped terminals are clearly possible, and we expect DEC to give them a whirl. Whether their price/performance (especially when you count in the cost per workstation for the back-end VAX, its software and support) will be attractive remains to be seen.

> Digital must overcome its mistrust of PCs if the company wants to stay competitive in the next decade

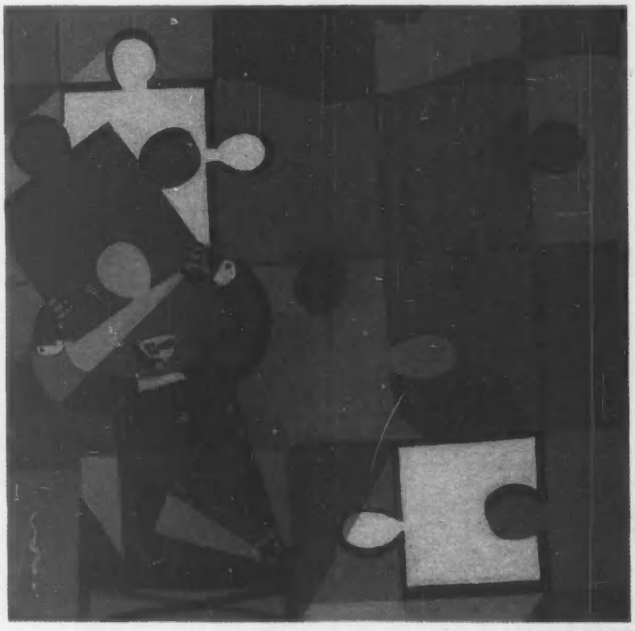
An interface optimized to a bit-mapped terminal might be unable to exploit the power available on new PC platforms. This ability is especially critical for DEC, since IBM is optimizing its new workstation strategy for departmental processing entirely around IBM's Systems Application Architecture and the OS/2 Presentation Manager.

Bit-mapped terminals aren't equivalent to PCs. Users like personal computers because of the feeling they give of controlling some part of the user's computing environment. Terminals can't offer control over performance or availability of data and computing resources.

More important, terminals can't run PC software, and no one seriously believes that any significant number of popular PC packages will soon turn up on VAX/VMS. Consider, for example, the trouble IBM has encountered trying to move a single popular package, Lotus Development Corp.'s 1-2-3, to the mainframe environment.

High-end headaches

DEC has also been less than successful in its high-end strategies. Basically, DEC would like to equip formerly mainframe applications (such as the information center) with high-end VAXs and Vaxclusters, competing especially with IBM's lower end mainframes. And the hardware seems adequate to



MIKE MCLAUGHLIN

Wohl is president of Wohl Associates in Bala Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

the assignment.

But software for these applications remains MVS-and VM-based, making it difficult for DEC to make inroads here. The real customer investment is and remains the software and the organizational knowledge of using and modifying that software. Maybe DEC should look for applications conversion software — or work with IBM mainframe software vendors to do the ports, just as IBM is working with DEC third-party software houses to get VAX/VMS software onto AS/400 platforms.

Pre-sale and post-sale support are always a problem for a rapidly growing company. Customer demands become more diverse and more sophisticated, just as the volume of work increases beyond anyone's ability to keep up. DEC is no exception. The problem is worsened by customer expectations (if you're going to market to big customers, the standard of comparison is always IBM). DEC also expects customers to be more self-sufficient (harking back to the good old days), and front-office customers rarely choose to be.

Attitude adjustment

On the marketing front, DEC is so much better than it used to be that further improvements here will now be evolutionary rather than revolutionary. But there is still the matter of philosophy. DEC marketeers often appear baffled that anyone could choose a non-DEC product over a DEC one.

It comes back to the Right Stuff. Serious computer users, DEC assumes, should know that DEC is the way to go. Maybe less serious users don't deserve DEC's products!

This attitude, combined with a certain arrogance born out of DEC's stupendous sales growth, can convince some customers that DEC just isn't their kind of vendor. DEC executives confess that they have had this problem from time to time, but they believe that internal memos and other attention-getting devices have put the arrogance problem into the past. We're not convinced. And big customers, used to IBM-style reactions to their every need, continue to claim that DEC's attitude is a barrier to doing business.

Loyalty — sort of

IBM customers may make detours and take holidays (remember their enchantment with Wang word processing throughout the late '70s and early '80s?), but if and when Big Blue gets its act together, they do come back.

Some part of DEC's success in the Fortune 500 front offices was based on IBM's inability to find appropriate, appealing products for parts of this market. As IBM ramps up the rest of the AS/400 offering, with multiple software and hardware announcements expected this year and next, DEC will have to work harder to maintain its former appeal.

Of course, DEC has something going for it here. First, there is inertial mass — DEC's staunch Fortune 500 customers and other accounts where it is the departmental system of choice.

Second, DEC has a vast catalog of generic and vertical software, much of it geared to big companies' front-office needs. The portable software that IBM will move from the System/36 and 38 to the AS/400 is geared more to smaller companies and specialized markets. Getting an AS/400 software pile that competes with DEC's will take some time.

This advantage gives DEC time to do several things:

- To consider rethinking its position on personal computers and come up with a strategy that fits customers' desires and needs rather than aging DEC philosophies. This means, at a minimum, a first-class, compatible and competitive PC offering. Better yet, DEC might also field a PC-plus, still wholly compatible but offering special features (VAX-on-a-desk?) that would be especially appealing to the DEC crowd. But DEC needs to understand that such a premium (and presumably pricey) product would not be a replacement or substitute for a competitively priced IBM-compatible under DEC's own logo.
- To rework its marketing philosophy, remembering that customers, even reluctant ones, are always right.
- To capitalize on its success in the Fortune 500 and make further inroads into existing and new customer sites.

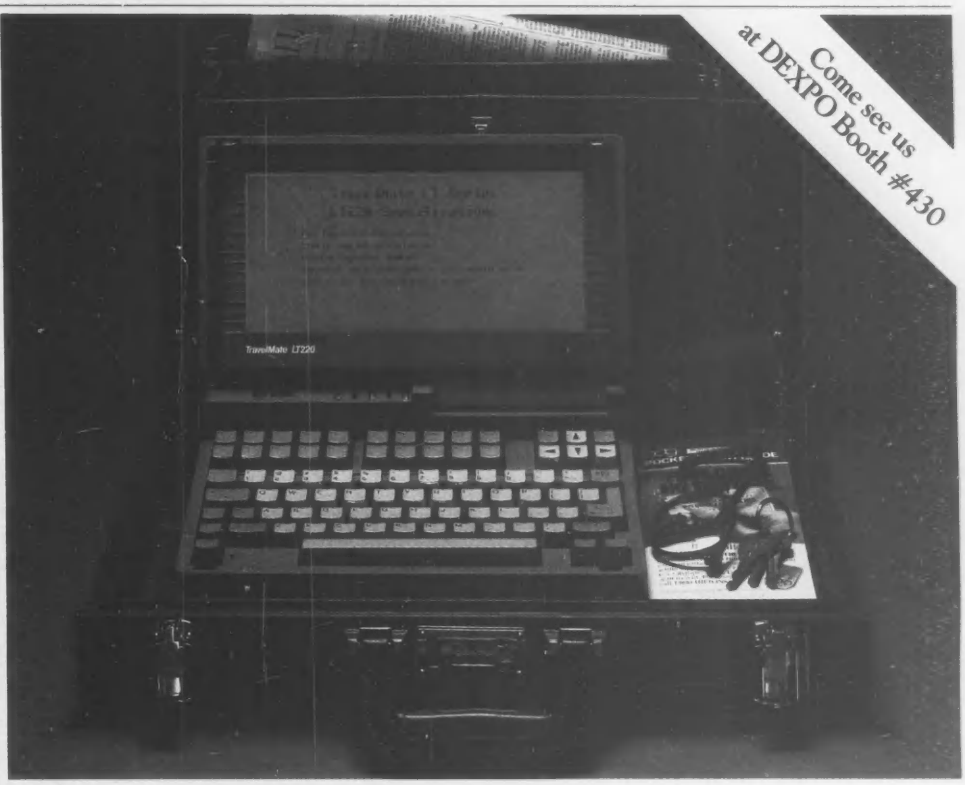
In the area of networks, DEC continues to have success. New network announcements in mid-September of its Enterprise Management Architecture (EMA) are designed to give users an intelligent and self-managed network, with easy interconnection to other (read IBM) networks.

But this product rollout will take two years or more (the architecture has already been in development for more than two years). Other vendors will not be standing still as DEC's products roll out; our files are full of quite similar unannounced plans.

But DEC should not weep over IBM's success in the mid-range. The AS/400 may prove to be a powerful competitor both in mid-range business applications and in the office, but IBM's potential success in the departmental office may provide a real plus for DEC. If IBM succeeds this time in the office, it will finally validate that market and open it up for DEC and others.

There are millions of office employees not yet automated at all — and nearly none who couldn't use more computing power and functionality.

So the glory years for DEC of rapid growth and increasing power may, surprisingly, lie ahead and not behind. •

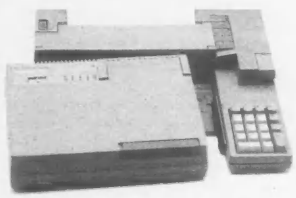


TI's new TravelMate™ LT220.
It's the closest thing to carrying a VAX™ in your briefcase.

Texas Instruments introduces the LT220 lap-top terminal — the next best thing to being there when you need remote access to your company's VAX.

The LT220 provides full VT220 emulation in a 4.8-lb. package, without sacrificing functionality. It features a 25-line screen that's easy to read. It even has a full-function keyboard like the one on a VT220.

The terminal communicates at 1,200 or 2,400 bps through one of its optional internal modems. For hard copy, just slide the LT220 into one of its optional cradles to add an ink-jet or thermal printer.



New credit-card-sized memory cards let you create, update and store files. They're also handy for programming the LT220 to your specific application.

Like its Silent 700™ predecessors, the LT220 sets new standards for portability, durability and reliability. All of which makes it the perfect tool for anyone who's ever wished for a VAX in their briefcase. In short, this may be the best little terminal in the world.

So go ahead. Take the first step toward improving your productivity today. Call Texas Instruments for more information or to arrange a demonstration of the LT220. **Phone toll-free, 1-800-527-3500.**

TEXAS INSTRUMENTS

36154
© 1988 TI
Silent 700 and TravelMate are trademarks of Texas Instruments Incorporated.
VAX is a trademark of Digital Equipment Corporation.

Circle Reader Service Number 3

RACING INTO THE '90s

BY DALE KUTNICK

Without question, Digital will be a different company in 1995. It has emerged from the 1980s as the unquestioned No. 2 computer maker and

has left its mid-range rivals in the dust. But despite these solid advances, DEC faces a new set of competitors now challenging its leadership on all fronts.

DEC's evolution over the next decade will not be a smooth one; the background noise of international competitors will rise, and DEC's financial performance will continue its irregular rhythms.

But DEC will continue to gain ground as the primary computing alternative to IBM. To do so, DEC must accomplish six key goals during the next five years:

- Dominate the personal computer/desktop connectivity and interoperability market.
- Continue to gain mid-range market share — even, if necessary, at the expense of higher profits.
- Become a serious player in the on-line transaction processing (OLTP) and database management system markets.
- Improve its commercial data center market (for example, as a "host") penetration.
- Maintain leadership in the scientific, technical and engineering marketplace.
- Expand its solid position in networking and capture more corporate, backbone, wide-area networks.

The desk top

DEC's failure to mount a serious challenge to the desk top could have severe repercussions during the next decade, as IBM PCs continue to proliferate and grow into larger machines, much as PDP-11s grew into VAXs. With more than 30 million business PCs installed worldwide, most of which have been seeded by IBM and the clones, the desk top is in danger of becoming part of the IBM environment.

DEC's reprieve in this arena is that IBM has lost control of the business PC market. IBM's 1988 share of the business PC market will be 20%. Many of the original clones have now lined up behind the Microsoft Corp. OS/2 standards and have formed a consortium to promulgate their own "intelligent bus" Extended Industry Standard Architecture. These clone makers will ship close to 30% of the market in 1988.

Also, the current installed base of PCs has no more affinity (that is, connectivity, interoperability) for the IBM 370 or System/36 and 38 (now Application System/400) world than it does for DEC, Unix or other mid-range systems.

While IBM is still struggling to guide its Personal Computer users into the higher reaches of the IBM processing world, PC local-area network servers and gateways offer these users access to whatever resources they might require.

Moreover, IBM's Micro Channel-based Personal System/2 and OS/2 Extended (with its proprietary database and communications subsystems and eventual Systems Application Architecture compliance) have already begun to destabilize the PC business.

These trends all favor DEC if it can provide highly functional workstation connectivity (especially to PC-DOS and Apple Computer, Inc. Macintosh systems) and offer attractive server packages.

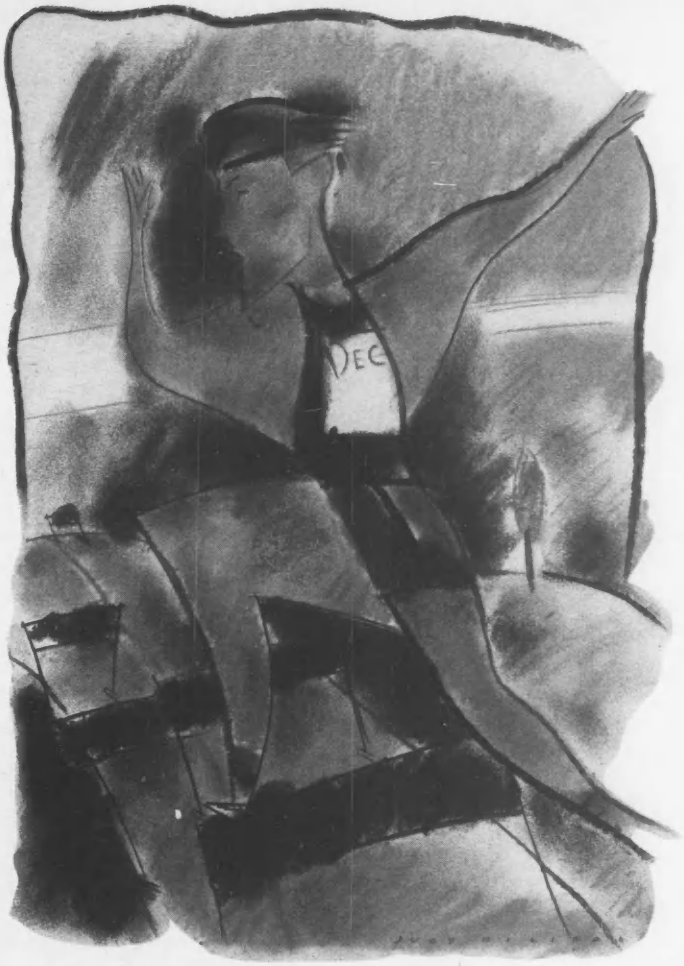
In this arena, DEC must act as a systems integrator and bring its VAX technology (and software and peripherals) down to an attractive price level or offer lower end solutions based on Intel Corp. 80386 systems, or do both. The problems here are not technical, but marketing and financially oriented, because server hardware is quickly becoming a commodity, with low margins.

The key issue for DEC is whether to build a costly end-user support infrastructure at a time when margins are already eroding and revenue growth is slowing. Also, can it afford to offer inexpensive, well-networked Microvaxes without cutting into its own higher margin supermini (VAX 6200 and 8000) sales?

The answer is that DEC will likely move slowly in this arena, repackaging the Microvax 3000 and 2000 with less expensive disk drives and more modular software. Along with Decnet, Microsoft's LAN Manager and the Appletalk application program interface will be supported on these machines.

While DEC won't be price-competitive against the retail-based

Kutnick is a data processing and communications consultant based in Redding, Conn. He was formerly executive vice-president of research at the Gartner Group, Inc. and executive director of Yankee Group.



microservers of 3Com Corp. and Novell, Inc., it will offer better integration and support.

DEC is also keeping its place on the desk top by pushing alliances with Compaq Computer Corp., Apple and, most recently, Tandy Corp. DEC will offer better integration of these PCs into its environments through the Network Application Support program. DEC will also offer a 386 machine that will be produced by Tandy in the near future, with tight integration into Decnet and All-In-1. While DEC won't aggressively price the machine, it should feature cooperative processing on it and on the Compaq and Apple systems by late 1989.

I do not expect DEC to improve appreciably its PC/desktop standing during the next five years. DEC will rely on networking, servers and integration to compensate for its poor desktop showing.

DEC will instead serve as the upward integration champion for recalcitrant clone vendors like Compaq and for Apple.

Gaining mid-range market share

While the mid-range market typically encompasses not only traditional minicomputers but also technical workstations and minisupercomputers, which are growing faster, the bulk of the market is still 32-bit minis that time-share terminals and PCs. This is DEC's tour de force, and it continues to outdistance the competition in this arena.

As a result, I expect DEC to increase its 27% mid-range market share in 1987 to more than 31% by 1993. While it will lose some ground in the workstation and technical markets, it will take additional share from the traditional mini vendors; only IBM, via the AS/400, and HP will experience double-digit growth here.

The mid-range problem, however, is that the minicomputer industry will "only" grow at about 11% or 12% annually during the next five years, and it is in the midst of a price/performance battle that will drive down margins.

Moreover, much of this segment's growth will come from commodity-oriented PC LAN servers running PC-DOS, OS/2 or Unix derivatives on aggressively priced Intel 80286 and 386, Motorola, Inc. 68000 family and reduced instruction set computing (RISC) platforms. These systems, which will increasingly offer multiprocessor options, will effectively garner the departmental and office market that the mini vendors had been slowly nurturing. On the more traditional minis, Unix is building momentum (35% annual growth), and this activity will tend to turn the mini into a commodity.

But because of its huge VAX installed base of more than 225,000 and the prodigious nucleus of VMS applications packages, DEC is in an excellent position to play the Unix game from a proprietary (in other words, VMS bridge) angle. It can continue to push VMS to its installed base and offer interoperability with Ultrix while concomitantly offering Unix to new customers who desire it.

New Microvaxes and products like the 6200 family will help, but some margin erosion will occur. The 8800 series will see extreme pricing pressure in the next year. New high-end machines in 1989 (Arius — a 10- to 12-MIPS uniprocessor) and 1990 (Aquarius — a liquid-cooled 20- to 24-MIPS uniprocessor) to significantly boost price/performance and keep DEC's loyal customer base moving ahead.

DEC may not produce another true mid-range processor, choosing instead to rely on symmetrically linked Microvaxes (which will hit 8 to 10 MIPS by 1990) like the current 6200. By 1995, Vaxclusters will be fiber-optically linked, running at more than 100M bit/sec., supporting an array of specialized systems, including RISC, floating-point, database, artificial intelligence and communications processors. The danger is that these smaller, networked systems could erode high-end high-margin sales.

Software strategies

Two key initiatives for DEC's future growth will be in the software arena — in specific subsystem software like DBMS, OLTP and communications, and in managing larger data center complexes through facilities like performance monitoring, systems management and administration tools and utilities.

To penetrate deeply within large user organizations a la IBM, DEC must increasingly assume the role of total information systems management provider. Software and networking are rapidly becoming the most important driving forces to accomplish this goal. They will form the basis for all of the mission-critical systems and applica-

tions in the 1990s. In DEC's drive to capture the soul of commercial information processing systems in the 1990s, controlling the OLTP and DBMS subsystems with superior offerings is mandatory.

IBM has dominated OLTP with its CICS and IMS/DC subsystems; more recently, Tandem Computers, Inc. and Stratus Computer, Inc. have carved modest slices of the market. While some DEC systems have been used for OLTP, it was not a serious player, due to VAX limitations.

This changed last spring when DEC unveiled VMS 5.0 with symmetrical multiprocessing, which enabled its systems to be scaled almost linearly and to offer a single systems image for large applications like OLTP across a four-system complex.

In late spring, DEC announced DECTP, based on Intact, a licensed third-party OLTP product, and delivered a 300% to 500% performance improvement in RDB, its relational DBMS. From a pure OLTP performance standpoint, DEC is now competitive with Tandem and IBM, although it lags slightly in functionality.

Even more important, DEC sales reps can now feel comfortable selling RDB, whose previous incarnation as a ragged canine enabled Oracle Corp. to capture a significant slice of VAX DBMS sales (DEC even recommended it).

The bottom line is that the DBMS will increasingly be the key to controlling users' software from application development to office automation, OLTP, systems management and decision support. IBM's DB2 is already moving rapidly on these fronts.

But DEC's technical achievements in molding VMS and the VAX to support world-class OLTP and DBMS environments is only part of the battle. It must still learn to market, sell and support these systems, and that will take three to five years. The more profitable and challenging tasks ahead remain RDB groundwork and user education that will pay handsome dividends in the future. These will be difficult tasks.

Other challenges: DEC must persuade its third-party applications vendors to write to RDB and to support its Distributed Transaction Architecture. DEC must also become a leading provider of distributed DBMS software tied into Decnet (we don't expect a full-function product here until 1991) to keep DB2 isolated in the data center. Finally, it must port RDB to Ultrix. These initiatives lead naturally to requirements for increased system management and administration.

Mastering MIS

While DEC has gained considerable ground selling to MIS, it is still primarily an adjunct processor for specific applications and solutions. DEC is just beginning to penetrate large data centers as an equal partner to IBM.

Until the spring 1988 multiprocessing announcements, DEC's largest single image processor complex was well under 10 MIPS. The Vaxcluster is not appropriate for large, single applications or for managing and administering multiple systems.

Indeed, it is the area of complex systems management and administration that will provide DEC with its greatest challenges in the early 1990s. These challenges include: managing large direct-access storage device farms, storage hierarchies and data set migration; controlling software releases and tracking multiple simultaneous applications across a network; handling performance monitoring and tuning; and creating simple chargeback and billing systems. These are tools to make MIS' job more systematic and easier.

In these areas, IBM has years of experience that give it a distinctive competence. Yet progress on complex systems management — for example, at data centers with more than 1,000 MIPS installed; networks with more than 20,000 terminals — has been slow, and applications development has been constipated. For this reason, many IBM shops' data center growth has not continued its projected (by IBM) upward spiral during the mid- to late 1980s. IBM is just now working through some of these problems and is looking to the '90s for solutions in AI and expert systems.

While IBM's problems have left an opening, it will be difficult for DEC to assume control here.

Where DEC's business will come from

Its strongest growth into the next decade will be in software

	Worldwide sales						
	Minicomputers	Workstations	Micros	Peripherals	Networking products	Software	Service
1986	$2.75B	$219.8M	$381.8M	$1.04B	$293.3M	$410.7M	$2.45B
1987	$3.35B	$290M	$439.1M	$1.20B	$345.9M	$629.1M	$3.14B
1988*	$4.08B	$382.7M	$505M	$1.38B	$408M	$877.5M	$3.82B
1992*	$8.92B	$1.16B	$883.1M	$2.41B	$790.1M	$2.51B	$8.47B
Average annual growth rate	22%	32%	15%	15%	18%	35%	22%

* Projected

SOURCE: FROST & SULLIVAN, INC.
CW CHART

DEC VIEW

BY GLENN RIFKIN
CW STAFF

In order to create its future, DEC will look to those who helped formulate its hugely successful present. Among the key players is Bill Strecker, the 44-year-old vice-president in charge of product strategy and architecture.

Working under DEC's former engineering guru, Gordon Bell, Strecker was the architect of the company's flagship VAX line as well as its ubiquitous interconnect strategy.

Strecker has been rewarded with a vice-presidency and the role of guardian and chief evangelist of the product strategy. In fact, as DEC is known to do, Bell has largely been expunged from corporate history, and Strecker is generally given credit as the genius behind VAX.

Though he may not deserve the full credit for the VAX strategy (Bell in fact laid out that strategy), Strecker is considered by Bell and others as among the best computer architects in the business.

In his current role, Strecker oversees the work of senior technical people, helping to bring together the disparate groups within DEC's often chaotic matrix. He then goes out and sells the concepts within DEC and, to some extent, to the customer base.

According to Strecker, the significant question DEC must answer as it heads into the '90s is how to take the concept of networking to its next level of efficacy.

"It is fundamental that we make networking pervasive and easy to use," he says. "Most large organizations have some form of a network today, but very few have tied every part of the organization together and made it easy to use. It takes a lot of work to make it easy to use. It's frightening how much hasn't yet happened."

Strecker also believes that networking on its own is of little value. Companies, he explains, need to build real applications that exploit the strength of the network and are useful throughout the enterprise. In this regard DEC has plenty to keep it busy into the next decade.

Strecker is undaunted at the thought of a renewed and vigorous IBM going hard after DEC in the 1990s.

"It is fundamental that we make networking pervasive and easy to use."

Bill Strecker
Vice-President
Product Strategy
and Architecture

"We have a lead, and our objective is to keep that lead," Strecker says, referring to DEC's unified product strategy. Unlike IBM, DEC doesn't have an installed base of "glass-room" computing nor a variety of architectures to support, he says.

"We feel confident that our ability to focus on one strategy will level the playing field," Strecker says.

Regarding DEC's well-documented failure at the desktop level, Strecker is thoughtful. He claims it is "a leap of faith" to say that DEC must be good at everything.

The key, he says, is integrating the enterprise, and he doesn't believe that making smaller computers is critical to that effort.

"The low end is a very different kind of space," he says. "We expect to see a large diversity of small computers in the enterprise. We're not expecting to produce a small computer to dominate that space. We look at that space and ask, 'How can we add value?' If you can't add value, it doesn't necessarily behoove you to get in that space."

Strecker does acknowledge that DEC will introduce a VAX on the desktop (known currently as the Personal VAX). He says the machine will offer a level of power and functions "you can't get from any other vendor."

He is also quick to point out that DEC sold 500,000 terminals last year and thus is a major presence on the desktop. "People believe it's all over and PCs are everything, but we're doing more than our fair share with terminal-based solutions," he insists.

In looking to the future, Strecker foresees little change in the core values of the company. "One hardly ever foresees radical change unless something is broken, and DEC isn't broken in any fundamental way."

He acknowledges that the culture must be affected as DEC continues to expand, but he believes that the internal use of technology — DEC's vast internal network — allows a large organization to feel like a small one.

"We've built an infrastructure that makes it easy for people to communicate and work on a peer-to-peer basis. We also have an ability to quickly organize teams to solve a problem — what I call virtual teams — and then tear them down. We don't believe in creating a hierarchy."

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 124 DALTON, MA 01227

POSTAGE WILL BE PAID BY ADDRESSEE

Computerworld Extra
Post Office Box 5112
Pittsfield, MA 01203-9930

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 124 DALTON, MA 01227

POSTAGE WILL BE PAID BY ADDRESSEE

Computerworld Extra
Post Office Box 5112
Pittsfield, MA 01203-9930

COMPUTERWORLD Extra

Reader Service Card
Issue: October 19/Expires: December 30, 1988

Please Use This Card For Product Information

Name _____ Title _____
Company _____ Phone _____
Address _____
City _____ State _____ Zip _____

A. Please check the business/industry in which you work: (check one)

End Users
1 ☐ Manufacturer (other than computer)
2 ☐ Finance/Insurance/Real Estate
3 ☐ Medicine/Law/Education
4 ☐ Wholesale/Retail/Trade
5 ☐ Business Service (except DP)
6 ☐ Government - State/Federal/Local
7 ☐ Public Utility/Communication Systems/Transportation
8 ☐ Mining/Construction/Petroleum/Refining
9 ☐ Other User _____ (please specify)

Vendors
10 ☐ Manufacturer of Computers, Computer-Related Systems or Peripherals
11 ☐ Computer Service Bureau/Software/Planning/Consulting
12 ☐ Computer/Peripheral Dealer/Distributor/Retailer
13 ☐ Other Vendor _____ (please specify)

B. Please check your main job function: (check one)
1 ☐ Corporate Management
2 ☐ Financial Management
3 ☐ MIS/DP Management
4 ☐ MIS/DP Operations
5 ☐ Data Communications Management
6 ☐ Data Communications Operations

C. Reason for this inquiry: (check one)
1 ☐ Immediate purchase
2 ☐ Future purchase
3 ☐ Information only

D. Is this your personal copy of Computerworld Extra? (check one)
1 ☐ My personal copy
2 ☐ I'm a pass-along reader

E. Please check the number of employees in your company: (check one)
1 ☐ Over 1,000 employees
2 ☐ 501-1,000 employees
3 ☐ 500 or under

Circle the # that corresponds to the number at the bottom of the item in which you are interested.

1	21	41	61	81	101	121	141	161	181
2	22	42	62	82	102	122	142	162	182
3	23	43	63	83	103	123	143	163	183
4	24	44	64	84	104	124	144	164	184
5	25	45	65	85	105	125	145	165	185
6	26	46	66	86	106	126	146	166	186
7	27	47	67	87	107	127	147	167	187
8	28	48	68	88	108	128	148	168	188
9	29	49	69	89	109	129	149	169	189
10	30	50	70	90	110	130	150	170	190
11	31	51	71	91	111	131	151	171	191
12	32	52	72	92	112	132	152	172	192
13	33	53	73	93	113	133	153	173	193
14	34	54	74	94	114	134	154	174	194
15	35	55	75	95	115	135	155	175	195
16	36	56	76	96	116	136	156	176	196
17	37	57	77	97	117	137	157	177	197
18	38	58	78	98	118	138	158	178	198
19	39	59	79	99	119	139	159	179	199
20	40	60	80	100	120	140	160	180	**200**

☐ I have circled #200 on the Reader Service Card to enter my *Computerworld* subscription for one year, 51 weekly issues and 12 *Computerworld Focus* issues for $44 and please bill me later. This rate valid only in the U.S.

①

COMPUTERWORLD Extra

Reader Service Card
Issue: October 19/Expires: December 30, 1988

Please Use This Card For Product Information

Name _____ Title _____
Company _____ Phone _____
Address _____
City _____ State _____ Zip _____

A. Please check the business/industry in which you work: (check one)

End Users
1 ☐ Manufacturer (other than computer)
2 ☐ Finance/Insurance/Real Estate
3 ☐ Medicine/Law/Education
4 ☐ Wholesale/Retail/Trade
5 ☐ Business Service (except DP)
6 ☐ Government - State/Federal/Local
7 ☐ Public Utility/Communication Systems/Transportation
8 ☐ Mining/Construction/Petroleum/Refining
9 ☐ Other User _____ (please specify)

Vendors
10 ☐ Manufacturer of Computers, Computer-Related Systems or Peripherals
11 ☐ Computer Service Bureau/Software/Planning/Consulting
12 ☐ Computer/Peripheral Dealer/Distributor/Retailer
13 ☐ Other Vendor _____ (please specify)

B. Please check your main job function: (check one)
1 ☐ Corporate Management
2 ☐ Financial Management
3 ☐ MIS/DP Management
4 ☐ MIS/DP Operations
5 ☐ Data Communications Management
6 ☐ Data Communications Operations

C. Reason for this inquiry: (check one)
1 ☐ Immediate purchase
2 ☐ Future purchase
3 ☐ Information only

D. Is this your personal copy of Computerworld Extra? (check one)
1 ☐ My personal copy
2 ☐ I'm a pass-along reader

E. Please check the number of employees in your company: (check one)
1 ☐ Over 1,000 employees
2 ☐ 501-1,000 employees
3 ☐ 500 or under

Circle the # that corresponds to the number at the bottom of the item in which you are interested.

1	21	41	61	81	101	121	141	161	181
2	22	42	62	82	102	122	142	162	182
3	23	43	63	83	103	123	143	163	183
4	24	44	64	84	104	124	144	164	184
5	25	45	65	85	105	125	145	165	185
6	26	46	66	86	106	126	146	166	186
7	27	47	67	87	107	127	147	167	187
8	28	48	68	88	108	128	148	168	188
9	29	49	69	89	109	129	149	169	189
10	30	50	70	90	110	130	150	170	190
11	31	51	71	91	111	131	151	171	191
12	32	52	72	92	112	132	152	172	192
13	33	53	73	93	113	133	153	173	193
14	34	54	74	94	114	134	154	174	194
15	35	55	75	95	115	135	155	175	195
16	36	56	76	96	116	136	156	176	196
17	37	57	77	97	117	137	157	177	197
18	38	58	78	98	118	138	158	178	198
19	39	59	79	99	119	139	159	179	199
20	40	60	80	100	120	140	160	180	**200**

☐ I have circled #200 on the Reader Service Card to enter my *Computerworld* subscription for one year, 51 weekly issues and 12 *Computerworld Focus* issues for $44 and please bill me later. This rate valid only in the U.S.

②

Third-party facilities and utilities vendors like Computer Associates International, Inc. are now moving their wares over to the VAX world in search of new growth. DEC must forge relationships with them if it is to accelerate its progress.

The bottom line is that DEC's "mainframe" pronouncements are more of an R&D ego trip, since the large systems market is slowing. Some of DEC's customers will require these behemoth 20-plus-MIPS uniprocessors, but the vast majority will opt for clusters, whether tight or loose, or networked systems. DEC's real challenge is data center management and administration. I believe it will make little progress here against IBM during the next five years.

The technical market

For the past three years, DEC's hegemony over the technical and engineering markets has been eroding. But this critical market still represents more than 30% of DEC's business.

Sun has taken the lead in workstations, with HP, Apollo and many others in hot pursuit. In compute-intensive environments, Convex Computer Corp. and Alliant Computer Systems Corp. have taken a major piece of the action despite some financial setbacks. The major problem has been DEC's slow responses to Unix and to aggressively priced RISC and 80386 and 68020 hardware platforms.

While DEC's Unix-based systems, including peripherals, accounted for more than $800 million in 1987 revenue, DEC lost ground in Unix functionality and performance. In the scientific, technical and engineering markets, DEC will continue to ply VMS as long as the market accepts it, but it is clear that Unix is increasingly becoming de rigueur, even for DEC. As a cofounder of the Open Software Foundation (OSF), DEC will have a major voice in setting Unix's future in the commercial and technical markets.

Recent Ultrix enhancements keep DEC in step with the Unix market. We expect that within one or two years, DEC will finally bring its major software subsystems — All-In-1, RDB and so on — into the Ultrix environment. It will also support symmetric multiprocessing, as it does under VMS. It must do so to remain competitive.

The more difficult issue facing DEC is a competitive hardware platform on which to run Ultrix — to challenge Sun Microsystems, Inc., Apollo, HP, IBM and a bevy of start-ups at the workstation level, and vendors like Convex and Alliant at the minisupercomputer level.

DEC's response: RISC workstations from Mips Computer Systems, Inc. by the end of the first quarter of 1989, plus a repackaged, repriced (under $20,000) Vaxstation based on the Microvax 3000 within the next few months and a near-tripling of Microvax performance — 8 to 11 MIPS — on a new chip set in 1990.

Nonetheless, DEC will be unable to dominate this market because of the other players' strength and because Unix will level the software subsystem and applications playing field by the early '90s. Indeed, I expect DEC will lose some share during the next five years; but even more significantly, DEC will have to forsake its high margins in this area.

Users will be the beneficiaries of the technical computing wars. They will gain more applications portability across hardware platforms; many new applications; cheap hardware; and a high degree of interoperability between VMS and Unix. That interoperability will be one of DEC's key differentiators.

Networking

During the past five years, DEC has evolved Decnet into a premier network architecture — the equal of IBM's Systems Network Architecture (SNA), although they differ in form and function and address different user requirements. But even here they are moving closer together — IBM in its LU 6.2 peer-to-peer offerings, and DEC in its network management. SNA and Decnet functionality and services are years ahead of those currently offered by other vendors; it will take the OSI implementors until 1992 and beyond to offer what DEC and IBM are doing today.

DEC will slowly migrate Decnet to the OSI framework during the next five years, and it will garner significant conversion revenues in the process.

Indeed, DEC must carefully balance the promise of standards against Decnet products that it can deliver today. I believe it is doing a credible job here, at least from a marketing standpoint — it is posturing itself as a standards champion while selling its proprietary Decnet solutions. Nonetheless, by the early 1990s, DEC will be one of the leading OSI suppliers.

While DEC has numerous challenges in the network arena, they are less against competition, with the exception of IBM, than against itself. The major target is the corporate backbone network, which is still open and evolving in many accounts, despite a strong SNA orientation.

While Decnet now has hundreds of thousands of installed nodes in both wide and local-area, or Ethernet, networks, they tend to be more in pockets; IBM owns the major chunk of current centralized corporate data nets. It will be difficult to wrest control of this strategic architecture from IBM simply because of its MIS entrenchment. Moreover, DEC's success will be inextricably linked to improved data center penetration.

Other challenges facing DEC networking include the implementation of standards, further refinement of network management offerings, integration of voice, including private branch exchanges, better support for large terminal nets, better SNA interoperability, leadership in the provision of high-speed (that is, fiber-optic) nets and many others. DEC is already well along in most of these areas; for instance, the IBM Token-Ring connection will probably be delivered by the middle or end of next year. DEC's most recent SNA gateway and IBM channel connect products exemplify the company's leadership in the connectivity area.

The bottom line: Networking is and will continue to be a significant revenue opportunity for DEC, and it is well positioned to take advantage of this arena. DEC will be a leader in standards implementation. DEC will increasingly share control and management of the backbone network with IBM. The impact on the market is that other vendors will increasingly be forced to offer Decnet connectivity as well as SNA compatibility.

Putting it all together

DEC will enter the 1990s in excellent condition, from both a customer base and total system perspective. It is especially strong in networking, in applications software availability and in third-party support. VMS is evolving well, although it will require some major revitalizing surgery in a few years, as will the entire VAX architecture.

Like IBM, DEC will seldom be the price leader in a particular product area, and hence it is vulnerable to specific competitive thrusts, especially in its hardware products. But to paraphrase an old IBM marketing slogan: "It's how we put it all together that makes us distinctive." Indeed, DEC will become more like IBM as it grows.

I expect the hardware competition problem to worsen across all products during the next few years because of RISC, commercial micros and buses in innovative architectures and Unix. DEC's margins and earnings per share will suffer as it cuts prices to stay competitive while it continues to feed R&D and build the necessary software, service and support infrastructure for the '90s. DEC must also develop new pricing and packaging strategies for its software and services.

DEC is only in the early stages of a difficult transition from a hardware company to a networking and software company. But it must move in agonizingly slow degrees to keep its momentum while turning the ship. ■

User View

H. W. Howard
Vice-President
of Information Technology
Bechtel Group, Inc.

Although there are many standards available for data communications protocols; data representations; program languages; file and document interchange; and data description, as yet, there is no standard for data interpretation. The standards area is difficult, characterized by compromise, little agreement among vendors and a lack of sufficient precision, accuracy and completeness.

Computers from different vendors must communicate with each other. With the ongoing evolution of protocol standards, customers will no longer accept special-purpose, custom protocol-conversion software development.

Computer and communications product vendors have favored incompatibility because product differentiation and incompatibility give them a perceived advantage. Proprietary solutions offered maximum functionality for each discrete product offering. Solutions were based on the absolute minimum adherence to standards that the vendor perceived necessary to complete. Today, users are demanding stronger and stronger adherence to standards so that these islands of automation can interoperate.

A technically perfect standard that no one will implement is of no use to anybody. A useful standard is one that all interested parties will implement and use, even if a more elegant solution is available in a proprietary implementation.

DEC and all other major players face the same issues. Any vendor not aligned with user needs as a primary marketing strategy will, in the long run, lose its market share and fail.

There are indications that some vendors are supporting standards and taking first steps toward interoperability and portability. As a response to IBM's closed system approach, DEC took another route and in 1983 announced it was committed to internetworking with IBM. Today, DEC is viewed as connecting to IBM better than some IBM products connect to other IBM products.

DEC realized that customers wanted an enterprisewide information network that would encompass voice, data and video and allow users to communicate anything, anywhere, anytime. DEC's announced strategy is to ensure that every device that DEC manufactures communicates with every device it has ever produced. Multivendor networking by DEC is targeted so that any computer can work with any other computer in a network.

In 1985, DEC inaugurated a plan to develop products compliant with the emerging ISO Open Systems Interconnect standards and to integrate the OSI standards with its Digital Network Architecture. This has put Digital in a strong position in terms of networking. Quite obviously, competitors of DEC wish to eliminate the "Digital has it now" slogan. IBM has made very significant strides in the last 18 months toward sorting out the confusion in its mid-range products and improving interoperability across the full range of its computers.

Users should expect the following from DEC:

- Improved interoperability with IBM, major workstation vendors and micro suppliers of hardware and software.
- Coexistence with third-party local-area network software, like Novell, Inc.'s, without users seeing a different interface.
- More applications solutions in conjunction with third-party software providers.
- Better integration with other electronic-mail and office systems.

To be competitive in the next five years, DEC must provide a solution that users want: interoperability across many non-Digital boundaries. This is essential.

No one vendor can provide a perfect solution. There will always be existing competitors and new entrants who recognize voids in product lines or strategies caused by the pace of technological change. Users need to be willing to allow innovators into the market for specialized applications, especially if they allow a user to build on what he has rather than starting over. Standards and open architecture provide the key.

Double Standard or Double-Talk?

How should users view Digital's dual operating system endorsements? Is VMS ready for retirement, with OSF Unix the way of the future?

BY DONALD C. BELLOMY

Two months ago, the folks at Digital's software center in New Hampshire gave me a coffee mug commemorating President Ken Olsen's 1987 proclamation that "Digital is a software company." But slogans are a dime a dozen from DEC these days. Remember "One architecture, one operating system, one network"? Not long ago, a VMS manager practically got lynched by her Ultrix counterparts for not discarding presentation slides that had outlived that particular party line.

What is potentially confusing is that the sources of Olsen's claims about Digital as a software company seem rooted in the strategic decisions encapsulated in the VMS manager's now-suppressed slides. Digital can ascribe much of its recent growth to an impressive suite of VMS software — whether developed by in-house developers, DEC's googolplex of value-added resellers and independent software vendors or users. The software spans a variety of compatible VAX systems and a wide range of performance and price points.

This does not mean that software is about to replace hardware as the engine of the computer industry. While it's true that growth rates for software sales and leases have been steadily outpacing growth in the value of hardware shipments, the fact remains that the total 1987 revenue of a software behemoth like Computer Associates International, Inc. was only 6% of Digital's.

DEC's revenue included more software money than CA made, but that's largely due to the monopoly factor. A systems vendor creates an operating system and the tools needed to make use of its hardware architecture and adds, at least, a database management system and office applications. While DEC offers some solutions as well, it's far more dependent on third parties than IBM.

The rationale is simple: A systems manufacturer is in the software business in order to sell hardware. That's not to say the software isn't necessary or that the revenue growth gained isn't welcome. What it does say is that software is secondary.

Moreover, systems vendors have had a fiscal incentive to emphasize only the software that runs exclusively on their hardware. That was the idea behind the VAX/VMS linkage — and a highly profitable idea it was, too.

Even when a nonproprietary operating system like Unix makes inroads on the VAX base, DEC typically responds with its own proprietary-ized Ultrix variant.

How, then, are we to view Digital's endorsements over the past year of both VMS and the Open Software Foundation's future Unix standard? Is DEC wholeheartedly committed to a double software standard?

VMS: Still vital after all these years

Four-fifths of the VAX installed base uses VMS as its predominant operating environment. About half (all VAX-11/700s, 8000s and 6000s) use the basic VMS operating system. Another 30% have been using MicroVMS, a subset of VMS for Microvax II systems that emulates some hardware instructions that Digital didn't have room for on its VAXinated microprocessors. (The newer Microvax 3000s included six of the hitherto missing instructions, which allowed more efficient processing of Cobol applications.)

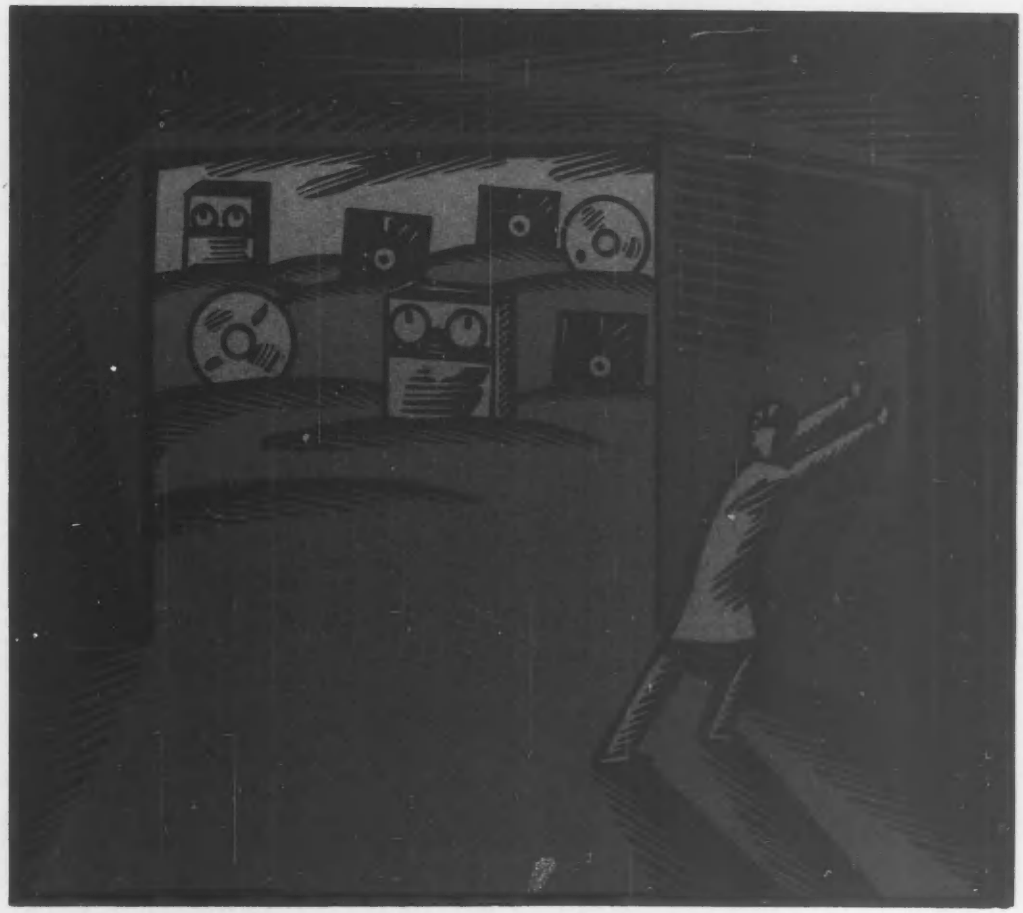
Digital has continued to invest in VMS. Version 5, announced in April, added a number of new features. Among the most significant were support of symmetric multiprocessing for VAX 6000s and the new 8800s; joint configurations of Vaxclusters and Local-Area Vaxclusters (that is, Microvax clusters); and a merger of MicroVMS and VMS employing larger system disk size on Microvaxes.

Documentation for Version 5 ran to 21,000 pages (compact disk/read-only memory distribution, already used for the operating system, is promised for the future to save the world's forests from DEC's documentation requirements). This is another way of saying that VMS has become a functionally rich, essentially mature operating environment.

Today, VMS has moved from its heritage in time-sharing to a mixed mode of time-sharing, batch and on-line processing. Digital describes VMS as ideal for production environments — in which a large number of users are running a known set of applications with very specific requirements for availability, data integrity, security and performance metrics.

If Digital doesn't quite have it today in all of these areas, you can probably expect the deficiencies to be the focus of future VMS releases.

Bellomy is director of systems research at International Data Corp. in Framingham, Mass.



ANTHONY RUSSO

The big push today seems to be to bring VMS to the desk top, where it can easily interact with larger systems servicing the department or enterprise. The inexpensive Vaxstation 2000 has lately been the advance guard in this maneuver; almost 90% of Vaxstations are being shipped with VMS rather than Unix, otherwise the operating system of choice for workstations.

It is also important to note that two of the new functions in Version 5 (the fusion of Vaxclusters and Local-Area Vaxclusters and of VMS and MicroVMS) were designed to demolish walls that tended to ghettoize Microvax systems into zones segregated from their larger brethren.

Nevertheless, questions remain about the future of VMS. Some wonder about the ceiling on 1970s software technology in VMS. By itself, though, this obstacle does not seem to be major. With the rise of what International Data Corp. has been calling "second-generation computing" based on open standards, there is no room for new proprietary operating systems, and the major open alternative to VMS is Unix, which is structurally similar to VMS in many respects, if only because both are about the same age. Indeed, few of the major operating environments extant today are much younger than VMS.

What we will see with VMS is what we have seen with the other major operating systems. New releases will continue to add more functionality for as long as possible. Eventually a new operating system will likely replace it, one that can take advantage of changes in software (including artificial intelligence), data management and hardware; but like OS/2 and Microsoft Corp.'s MS-DOS as well as IBM's OS/400, System/38 operating systems, MVS/XA or ESA and vanilla MVS, it will retain a strong measure of upward compatibility with today's VMS.

A more pertinent question involves the universality of VMS. Along with IBM, Digital is one of the few systems vendors that still tries to be all things to all users in all markets. IBM attempted to address different needs with different architectures and operating systems. That structure of late has proved much less popular with users than Digital's single-minded VAX/VMS approach. However, the growing diversity of processing requirements threatens to impose an upper bound on a broad, general-purpose operating system like VMS.

It is in reference to this question that the 1970s provenance of VMS, with its heritage in timesharing and interactive processing, poses problems. VMS has therefore been remiss in, to take two examples, real-time computing and on-line transaction processing.

Digital is responding in two ways. The first, which today is best represented by real-time computing, is to offload applications from VMS. VAXELN is a real-time development toolkit and run-time kernel. In May, Digital introduced the RTA Real-Time Accelerator for VAXBI-based systems, one or more separate hardware modules running VAXELN within a VAX 6000 or 8000 system. Real-time applications can be developed in VMS without encountering the performance limitations of VMS.

Digital's on-line transaction processing strategy today is not as segregated from VMS as real-time computing. The DECTP package announced this past July offered for the first time a relational database management system (RDB Version 3) and direct-access storage devices (the SA600 storage array) that could allow a VAX system running VMS to compete effectively in OLTP. But, as with IBM and CICS, a transaction monitor

atop the operating system is necessary. Digital has come out with Decintact, which will require at least three years of work to be fully integrated with the rest of DECTP.

By then, Digital will be on its way to adding a second way of dealing with VMS's limitations in OLTP. A transaction monitor will still be necessary, but important OLTP services (recovery, common journaling, two-phase commit, queuing and remote procedures) will have been added to VMS.

In some respects, *what* will be added is less important than *how* it is added. The services will come in a separate sysgen selectable adjunct to the kernel. By making the additions to VMS modular, Digital hopes to optimize the procedures for writing VMS OLTP applications without forcing non-OLTP users to pay, in money and overhead, for services they don't need or want.

The theory is so attractive, in fact, that it seems reasonable to expect Digital to offer other VMS options for specific needs. In this way, VMS can retain its universality as a general-purpose operating system running across different performance levels at the same time that it addresses particular requirements with specially tailored VMS modules.

If VMS goes this route, there is probably little in the software architecture to impose limitations on Digital. In fact, the chief problem may be the limitations VMS imposes on the hardware. The difficulties DEC encountered trying to develop a reduced instruction set computing-based VAX that could run VMS as well as Ultrix suggest that the rumored project with Mips Computer Systems, Inc. will be Unix-only.

The Ultrix/OSF alternative

Unix is currently the operating environment of choice for almost 20% of the VAX installed base. However, for a long time that choice was very much the user's, not DEC's. Digital didn't necessarily mind if users preferred another operating system, as long as they bought the hardware, but it didn't want to advertise a situation so at odds with the VAX/VMS marketing scenario.

> IN SOME respects, *what* will be added is less important than *how* it is added.

When Digital is in one of its Unix moods, it likes to recall that the operating system was first developed at AT&T Bell Laboratories in assembly language on a PDP-7, and that most early Unix licenses went for PDP-11s. But DEC did not officially announce support of Ultrix-32, its Unix version for the VAX line, until 1985, several years after the firm had started to sell it to users demanding a Unix option tuned to the VAX architecture. Almost in spite of itself, DEC became the market

VAX/VMS® PERFORMANCE SOFTWARE FROM

RAXCO RABBIT SOFTWARE

THE PERFORMANCE EXPERTS

For more information on how to make your VAX system perform better send to:

RAXCO, Inc.
2440 Research Blvd.
Rockville, MD 20850
(301) 258-2620

☐ RABBIT-9 V.A.S.T. (VAX Acceleration Software Technology)
☐ RABBIT-6 Report Generator
☐ RABBIT-7 Disk Optimizer
☐ RABBIT-5 High Speed Backup & Restore
☐ RABBIT-2 Capacity Planner/ Performance Analyzer
☐ RABBIT-1 Resource Accounting

Name _____ Phone (____) _____
Company _____
Address _____
City _____ State _____ Zip _____
CPU Size(s) _____

*VAX/VMS are registered trademarks of Digital Equipment Corporation CW 10/17/88

User View

Michael J. Selden
Director of Information Services Manville Specialty Products Group

Manville Corp., like many companies in the 1980s, faces the problem of having an installed base of information systems that are entering their second decade of operation. The age of these machines makes their maintenance costs high. Since they were developed with older technology, they are difficult to enhance; in addition, they do not provide many features and capabilities that are available with current technology.

Having identified the need to replace these systems with state-of-the-art technology wherever justified, we developed a list of basic requirements that our hardware/software environment of the future would have to meet to satisfy our business needs.

We are evolving from a highly centralized management structure to one in which more management functions are being moved to the business group level. As a result, it will probably be cost-effective to process data at the local plant, district or division level. Therefore, we will need cost-effective distributed processors.

There will be many opportunities to use purchased software for small local system applications. We need a vendor with a large third-party software base.

Our users are becoming increasingly computer-literate. They require access to data as well as tools with which they can write their own applications using that data. The computer environment must be easy to use and have relatively straightforward procedures to generate and message management information locally.

Networking is a very important requirement for our new environment. Our new information systems will have to pass data from our plants, sales offices, warehouses, customers and vendors to our corporate mainframe, as well as other processors across our company. This communication must be done in a way that minimizes complexities and makes it as simple as possible for the user.

Our business operations comprise large, medium and small locations that can all use the same software, with some variations across locations. It is important that we can use common software, purchased or developed at the business group level, on different size processors.

As we develop our new systems, we will be developing interfaces between our business systems and our process control and CAD/CAM equipment. It is important that our hardware/software vendor provide these interfaces.

Computer interfaces with the outside world (customers and vendors) are becoming increasingly important in today's business environment. We cannot dictate what hardware and software they will use, but our systems will have to pass data between our computers and theirs. We need an environment that will facilitate this process.

Finally, our business operations are scattered throughout the country as well as Europe. Our vendor of the future must have an excellent service organization, with full national and international support, excellent training and technical support capabilities and be a financially stable leading force in the computer industry.

DEC has built a product line and supporting environment that meets our requirements. The company provides cost-effective minicomputer processing capabilities, from very small to reasonably large-sized machines, all using the same software environment. The networking capabilities are excellent, and their software base is large and varied.

DEC's working agreements with third-party software vendors and distributors have provided us with opportunities to explore a variety of application solutions. In the process control and engineering applications areas, Digital has been an acknowledged leader and a force in the industry.

No single vendor can meet all of a customer's needs. In configuring systems for our locations, we found printers from third-party vendors that are operationally more effective and less costly than those offered by DEC.

Digital's application development tools are less flexible and friendly than those offered by third-party vendors.

DEC's marketing strategies tend to be confusing; we have found competition in selling between different Digital sales offices in developing configurations for our operations in different parts of the country.

Finally, DEC continues to have a selling job to do on corporate management, which still tends to be colored "blue."

DEC, it seems, has established a solid direction for its technology. As it continues to perfect that technology in the future, it should endeavor to improve its transaction processing capabilities and work toward the development of a powerful minicomputer with a built-in database (which its primary competition has had for some time).

A message I would like to send to Ken Olsen is: Continue to develop your organization so that it becomes a working partner in your customers' businesses. Technical knowledge and support are great, but today's customer wants to deal with a computer vendor that can work with the customer to understand his business needs and offer creative solutions.

leader in the value of mid-range Unix shipments.

Under the circumstances, it's not surprising that Ultrix has been widely viewed as functionally inferior not only to VMS but to other vendors' Unix versions. Thus the absence of symmetric multiprocessing support in Version 3 of Ultrix-32, announced in August, was striking, not only in contrast to VMS Version 5, but also in contrast to the multiprocessing support announced virtually simultaneously for the latest version of Data General Corp.'s Unix product.

The key message

The new release of Ultrix does, however, say a lot about Digital's approach to Unix. The central message of Version 3 is open standards *plus* VMS coexistence.

Most of the new features in Ultrix-32 break down barriers between the VMS and Ultrix domains within the VAX kingdom. Ultrix Worksystem Software is the first implementation of the Decwindows program that is supposed to run across the entire VAX architecture (including MS-DOS PCs tied to the VAXdom). The VMS/Ultrix Connection adds Transmission Control Protocol/Internet Protocol (TCP/IP) and Network File System capabilities to VMS so Unix-based workstations can participate in a Vaxcluster, with the Vaxcluster acting as a server.

Ultrix Mail Connection VI links to Digital's Mailbus service and thus to X.400-compliant vendors' systems; IBM's Professional Office System and Distributed Office Support System; and All-In-1. Decnet-Ultrix Version 3 includes the capability for an Ultrix-based VAX system to act as the gateway between Decnet and TCP/IP-based networks.

The bottom line is that Ultrix and VMS will look the same to the end user and interact as well as any two incompatible operating systems can, but they won't actually be the same. ***There are no plans to facilitate application portability or a convergence between the two.***

There has been some confusion on this point because of the emphasis given to Ultrix Version 3's compliance with the newly anointed Posix standard. Although the IEEE committee that wrote the Posix specifications was thinking about Unix, it is widely believed that work is under way at Digital to allow VMS as well to adhere to Posix — which after all stands for Portable Operating-System Interface for Computer Environments.

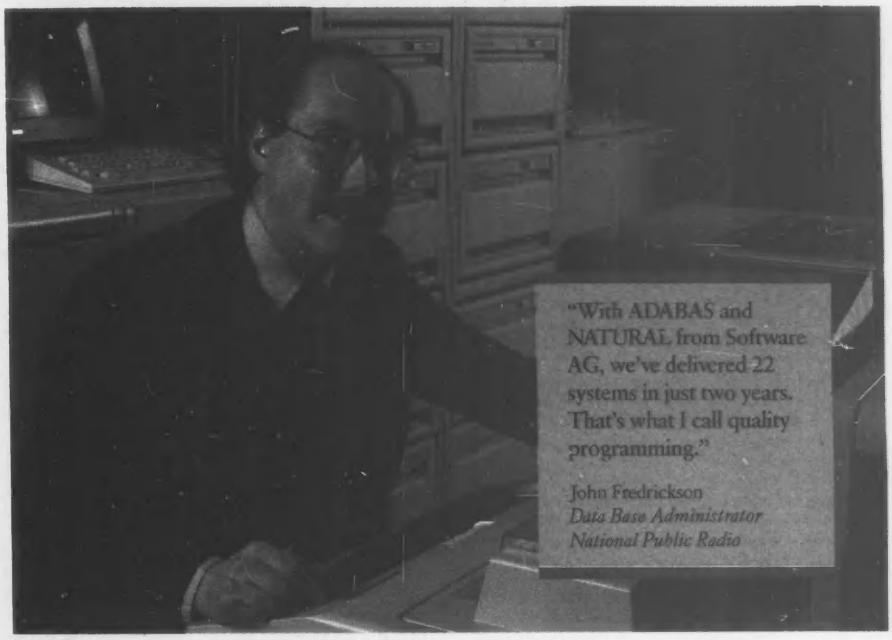
The purpose of Posix is to allow application portability at the source-code level. However, mere compliance with the very basic Posix specifications doesn't mean that a lot of code can't be written on top of the specs that would largely negate the promise of portability. It would be easier to port applications between VMS and Ultrix if they both complied with Posix, but each (particularly VMS) would include so much more than Posix that it's like saying it would be easier to swim the Atlantic with a life jacket than without one. That's true, but it's trivial.

Posix compliance was the most prominent statement of adherence to open standards at the announcement of Ultrix Version 3, but not the only one. Version 3 also complies with the National Bureau of Standards' interim Federal Information Processing Standard, the X/Open portability guide, the Open Software Foundation (OSF) Level 0 specs and *(sotto voce)* a standard that Digital declined to describe as open — the System V Interface Definition (SVID) from AT&T.

ULTRIX and VMS will interact as well as incompatible operating systems can, but they won't actually be the same.

A vendor like DEC supports standards for at least two reasons. First, important users (led by the U.S. government) want them, and therefore Digital must support them to win sales. Second, they can allow more efficient use of a vendor's internal development dollars if program-

For quality programming, National Public Radio turns to Software AG.


"With ADABAS and NATURAL from Software AG, we've delivered 22 systems in just two years. That's what I call quality programming."
John Fredrickson
Data Base Administrator
National Public Radio

Millions of listeners tune in to National Public Radio stations everyday for the best in non-commercial radio programming: great music, unparalleled journalism, interviews with the world's newsmakers, and invigorating discussions of the arts.

And for quality programming that maximizes the power of their Digital VAX cluster, National Public Radio turns to Software AG.

"To me, a good software product is one that increases productivity, quality, and accountability—while reducing operating costs," says John Fredrickson, Data Base Administrator for NPR's Computer Information Services department. "Software AG fourth generation technology has helped us achieve all this."

Software AG offers a complete family of more than a dozen VAX products, in use at more than 500 organizations around the world. These advanced technologies include:

- ADABAS, our relational data base management system;
- NATURAL, the 4th Generation applications development technology;
- PREDICT, an active data dictionary;
- SUPER NATURAL, for end user applications development;
- NET-WORK, our distributed communications technology for VAX and VAX-to-IBM environments.

The foundation provided by this family of integrated software tools creates a sound basis for future growth—into CASE technologies; computer-based training systems; graphics data processing; and a variety of end user facilities.

So tune in to some great programming: join the worldwide family of organizations who turn to Software AG for proven high-performance VAX software solutions.

For more information about Software AG VAX software, call toll-free:
1-800-843-9534

(In Virginia and Canada, call 1-703-860-5050)

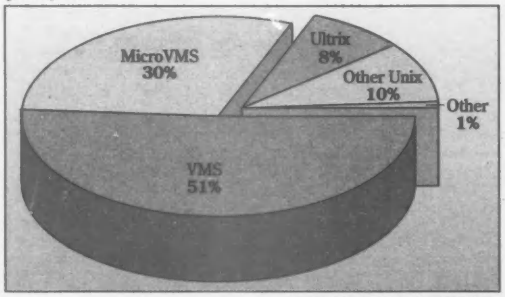
SOFTWARE AG
PROGRAMMING BUSINESS SUCCESS

ADABAS, NATURAL, PREDICT, SUPER NATURAL, and NET-WORK are trademarks of Software AG. VAX is a trademark of Digital Equipment Corporation.
Check local listings for your public radio station, or call NPR at 202-822-2323.
© 1988 Software AG of North America, Inc.

Circle Reader Service Number 5

The pick of operating systems

VMS was the choice for four-fifths of all VAX systems installed as of Jan. 1, 1988



SOURCE: INTERNATIONAL DATA CORP.
CW CHART

mers aren't continually reinventing the wheel.

But they must be open standards, by Digital's definition of open. That means standards in which DEC can actively participate — if not to direct them, at least to ensure the fewest possible sacrifices of existing investments, the highest feasible protection of the proprietary product portfolio and the widest potential for vendor-specific additions atop the standard.

All along, competitors had distrusted the openness of an operating system standard owned by a systems vendor. And AT&T did little to assuage them.

AT&T tried to put teeth into its standardization effort by changing the licensing rules. Starting this summer, it could test any vendors' products that claimed SVID compliance and compel their removal if they flunked.

Ouch!

The teeth drew blood. Major licensees, led originally by Digital and HP, later joined by IBM and several other vendors, turned on their tormentor. With the formation of the OSF, the hunter became the hunted. A year ago AT&T seemed in control. Now, people are asking whether the consortium will be allowed any face-saving compromises before it surrenders ownership of Unix to a separate spinoff and control of Unix standardization to the OSF.

As it stands now, the OSF is a standard after Digital's own heart. It is open in that all members contribute ideas and staff and are apprised of ongoing work, and contributions are solicited from the computer community at large.

The hope, though, is that it is also a sufficiently tight and independent organization to make decisions, stick by them and present them to the international standards body as essentially a fait accompli. Since the OSF hasn't yet actually had to make any decisions, this hope remains unproven.

Moreover, the type of standard envisioned by the OSF is Digital's ideal. Source code rather than binary compatibility is the goal, with Posix rather than the more restrictive SVID (especially in the future, when more features would have been added) serving as the compliance test. What's more, portability takes a backseat to vendor independence, since OSF sponsors, members and licensees are not compelled to implement all of the OSF modules.

There is plenty of room, then, for value-added extensions to the OSF standard. Digital planners already have a name for their extensions — Ultrix.

The idea is to implement standards where DEC stands to gain in programming or networking efficiency, and to stay proprietary (that is, Digital-specific) within Unix where DEC stands to gain a marketing edge. In other words, the OSF represents a vendor's-eye view of standardization.

VMS or Ultrix?

A successful bid for the OSF user interface could turn out to be a double-edged sword for Digital. On the one hand, all those OSF Unix applications could be training users for VMS and the Digital universe. On the other hand, all those VMS applications could be preparing users for Unix.

So we come back to the 64-gigadollar question: Has Ultrix/OSF/Unix really achieved parity with VMS in the eyes of Digital, and, if not, will it supplant VMS anyhow?

For right now, the answer has to be no. Digital still views Unix as a niche product, of primary interest today only to the U.S. government and some of its European counterparts, to some colleges and universities, to techies everywhere and to a few open standard-bearers in manufacturing and elsewhere.

And for right now that view has a lot to recommend it. An IDC survey of Digital VAX sites earlier this year found that while about a fifth already had Unix installed on a mini or workstation (not necessarily one from Digital), about half definitely would not invest in Unix systems over the next two years, and another fifth said they probably wouldn't or weren't sure.

That could change, of course. The open systems movement has been gathering such momentum of late that it will almost certainly change users' perceptions about Unix.

Even so, more favorable perceptions don't always result in sales. The biggest thing that VMS has going for it is the size of its installed base, which has reached the critical mass necessary to support it for a long time to come. While a growing proportion of new applications could go to Unix, few would be anxious to begin a wholesale porting of existing VMS applications over to OSF/Ultrix, however similar it might look to VMS on the screen.

But would users really want Unix, even then? Digital recognizes that there will be more and more open-system advocates as time goes on.

However, Digital also thinks that the majority of the customers it is most desirous of attracting, the bet-your-business commercial environments, will want to build on a safe, stable, vendor-guaranteed operating system. In other words, proprietary rather than open; VMS rather than OSF/Ultrix.

THE OPEN SYSTEMS movement has been gathering such momentum of late that it will almost certainly change users' perceptions about Unix.

Moreover, the direction and pace of software development favors VMS for these customers. While the OSF works on creating standards and Ultrix works on catching up with VMS, VMS is continuing to grow into new commercial environments like OLTP. It is no accident that Digital's transaction-processing architecture is built around its proprietary operating system.

All of this could change in five years or so, when OSF/Ultrix could finally be fully competitive with VMS. But five years is a long way off, and a lot could happen. After all, it was only five years ago that DEC was on the ropes and nearly everyone was ready to count it out. Five years ago, we find out now, AT&T thought that Digital was in such dire straits that it initiated discussions about a possible takeover.

Well, at least that would have solved the VMS-Unix conundrum. •

User View

Clair Goldsmith
Executive Director of Information Technology
University of Texas Health Science Center

The University of Texas Health Science Center at San Antonio routinely produces a four-year computing plan. Reviewing past plans indicates that there will not likely be significant changes in the computing style during the next several years. Certainly, there has not been a great change in the last few years.

However, there will be new products that we will want to take advantage of in an evolutionary, not revolutionary, way. The future can be characterized as being more of the same — more networks, more workstations, more file servers and processors.

It is a curious phenomenon that new technology does not really displace old technology; rather, it creates new applications. For example, workstations will not likely displace mainframes; rather, mainframes and workstations will coexist in a network.

Digital, the major supplier of our computer center, is well positioned to take advantage of this environment. The installed hardware today includes an Ethernet backbone supporting in excess of 1,200 terminals and personal computers. The computing resource itself is two clusters: one with two Decsystem-20s and a Vaxcluster consisting of two VAX-11/750s and an 11/785, an 8650, an 8700 and an 8800, with another 8800 on the way.

Digital has one of the most coherent network offerings available. Yet it cannot do everything. The existence of our Ethernet has permitted us to integrate Apple Macintoshes, IBM Personal Computers and Sun workstations into our network as third-party products became available.

Telecommunications will be a major challenge to integrate with computing. Digital will likely provide products that directly support the integration of telecommunications services, whether from a central office or from an on-premises private branch exchange. For example, ISDN may provide a telephone caller's number, but for a system to be useful, it must provide rapid access to information about that caller.

These areas are simply extensions of what may be expected from currently existing products and services. Yet the computing world will change in a more subtle yet more profound way. Open systems will become a major factor. The competitiveness of the marketplace will demand it. Open systems will give users more control over their environment by allowing them to select hardware and software from a variety of sources. Users may be more insulated from the disruptive changes typical in proprietary systems.

Digital can take advantage of open systems. The company currently supports the standards in networking and communications as well as operating systems. This will permit it to be at the forefront of developments in open systems. Digital needs to provide open systems both for native use and as part of its proprietary systems. Doing so will permit users to choose between portability and performance.

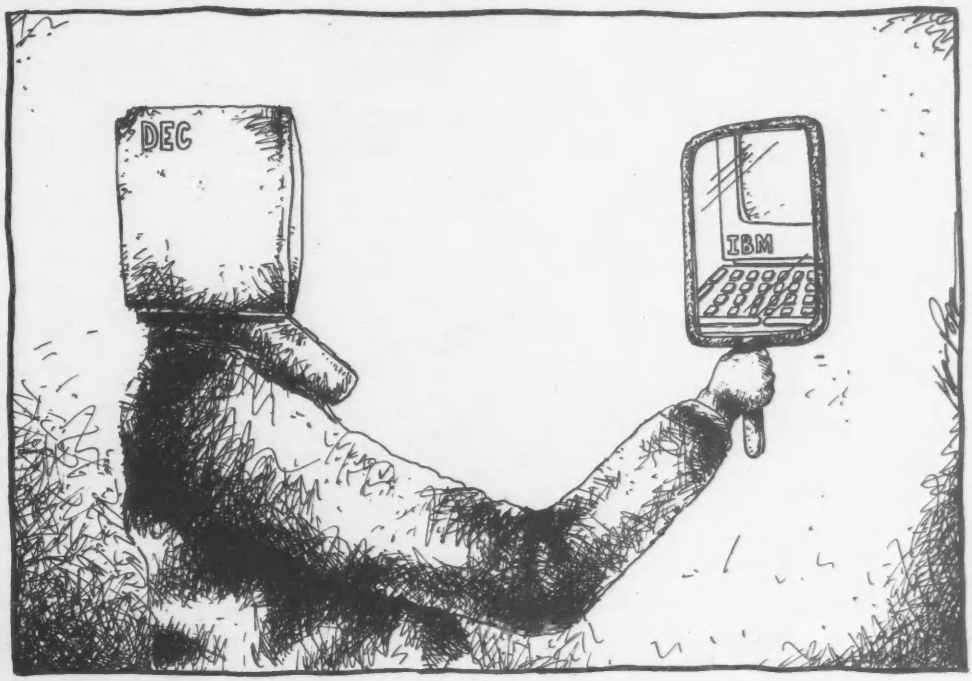
Users will not have the brand loyalty that has characterized the computer industry in the past. For Digital to truly succeed in this new marketplace, the organization's emphasis will have to be on cost of ownership and forging a partnership with its customers.

Unfortunately, cost of ownership and customer partnership are at odds with each other. Creating the partnership, in which the customer and Digital both feel their future success is intertwined, is an expensive undertaking. It requires Digital to invest the time to truly understand the customer's business. The customer must make a similar time investment.

Cost of ownership, on the other hand, requires that Digital reduce all expenses so that the prices of hardware and software maintenance, as well as price/performance, are the best in the marketplace.

This is the challenge for Digital in the '90s: to be both cost-competitive and customer-involved.

RHETORIC ASIDE, THE BATTLE RAGES



BY STANLEY GIBSON

"We often bid against IBM, but their approach is so different, we don't see ourselves competing with them."
Ken Olsen at DEC's annual meeting, 1986

Such ritual public denials of competition with IBM were once commonplace for Olsen. But while he was making such statements, *Decsell*, DEC's in-house magazine for salespeople, was carrying a list in each monthly issue of "Recent wins over IBM."

IBM similarly kept its public rhetoric muted with regard to DEC. Meanwhile, both firms were scrutinizing the other closely, probing for weaknesses and learning from strengths.

In general, DEC saw itself as an excellent technology company that needed to add marketing professionalism and slickness — long IBM specialties. IBM, on the other hand, has shored up its product line with some technology inspired by DEC. There are examples on both sides:

- IBM introduced Systems Application Architecture, offering a proposed set of common interfaces as a counter to DEC's cradle-to-grave VAX architecture.
- DEC has hired a number of former IBM sales representatives, in the hope of instantly adding marketing skills and Fortune 500 contacts. In September, 20-year IBM veteran Norman Goldberg was named group manager of financial industry systems at DEC.
- IBM is stressing peer-to-peer features in its Systems Network Architecture. Such features are an integral part of Decnet.
- IBM has instituted vertical marketing, originally a DEC practice. "DEC got a head start in vertical marketing because they had no marketing organization," says Sonny Monosson, a computer dealer, newsletter publisher and longtime DEC observer. Without the burden of an entrenched marketing philosophy, DEC was able to move directly into vertical marketing. "IBM has learned from DEC that it is much easier to sell to a variety of people through third parties."
- DEC increasingly gives its sales reps the IBM look, particularly at financial accounts, making sure their manner reassures customers. At DEC's traditional scientific and engineering accounts, "Our salesmen used to argue with customers, and the customers liked it," Olsen says. Now, conservative financial institutions feel safe "betting their business" on DEC, he says.
- IBM works more closely with third parties; it has established Business Partners, a program that borrows from DEC's Cooperative Marketing Program (CMP).

Pushing each other

Without the stiff competition that gave rise to this mutual emulation, many think it unlikely that each vendor would have been spurred to offer such innovations on its own.

"DEC is the best thing to happen to IBM in the last 20 years," asserts Bob Randolph, a DEC analyst at Technology Financial Services in Westford, Mass.

The new polish at DEC is welcome, one customer says. "We used to get some communications from DEC that were just E-mail notes. Now we get glossy brochures," says Dan Cense, manager of international systems at Polaroid Corp. in Cambridge, Mass. "DEC is growing up. You know they're going through many of the things that companies go through as they get older."

However, there are still cultural differences, Cense notes. "The DEC salesman is a looser guy." Typically, the DEC sales representative appears alone on sales calls, while the IBM reps come in groups of two or three. Cense will occasionally have pizza and beer with the DEC staffer, but the IBMers decline even coffee when offered.

It's users such as Cense who ultimately benefit from the DEC-IBM competition. He is currently on the fence deciding whether to go with IBM Application System/400 or VAXs for a large order. Both vendors have made numerous visits to woo him. Recently, he flew in an IBM private jet to the AS/400 manufacturing facility in Rochester, Minn. "They are aggressively pushing the AS/400. They do want this contract," Cense says.

He requested from each vendor "dirt," or performance information, they had on the competitor's machines. DEC showed him actual benchmark figures for the AS/400. IBM countered with Ramp C figures for DEC equipment.

Paul Shryock, MIS Director at Buckeye Cablevision, Inc. in Toledo, Ohio, says DEC escorted him to Las Vegas to see a demonstration and that IBM took him to Omaha, Neb., and Toronto for the same purpose.

Shryock, who ultimately decided on DEC equipment, says he believes his account was too small to prompt steep price-cutting. "There was not much of a bidding war. We are not a large account for either DEC or IBM."

However, stories of such price-cutting when the rivals go head-to-head are rampant — although difficult to substantiate. Randolph believes reports of discounting are true. "The underpinning of DEC's market strategy is to buy market share. IBM knows very well how to play that game. That *is* their game," he comments. "These MIS managers must be having a field day. They must be showing their

"IBM is very structured; you know what your job is. At DEC, you make your own job. To some highly structured people, it can appear to be chaos."

RICK CASE

Gibson is *Computerworld*'s senior editor, software.

Digital has it now.

The current International Data Corporation (IDC) report on the UNIX™ market states that Digital ranked as the #1 vendor of UNIX-based computer systems in 1986. Digital also ranked #1 for 1987, according to Dataquest Incorporated, of San Jose, California.

From the start, when the first UNIX software ever developed ran on a Digital computer, our commitment has been strong. As a result, we not only offer the

Once again, the experts report one company is #1 in UNIX-based systems. Digital.

widest range of compatible computers that run UNIX-based software, but we also lead the world in total dollar value of installed systems.

Digital's support of UNIX-based systems will continue because we believe in giving our customers a choice. The power of our own VMS. Or the most competitive version of UNIX in the market.

To find out how you can get your UNIX competitive advantage from Digital, write to: Digital Equipment Corporation, 200 Baker Avenue, West Concord, Massachusetts 01742. Or call your local Digital sales office.

digital™

© Digital Equipment Corporation 1988. The Digital logo is a trademark of Digital Equipment Corporation.
UNIX is a trademark of American Telephone and Telegraph Company. IDC is a trademark of International Data Corporation.

quotes to the other guy."

There were deals, "not in terms of pricing, but in terms of support, they were willing to provide," says an MIS official at a Western U. S. bank. At his institution, the selection process went on for six months before he chose a Microvax-based solution for branch offices.

MANY OBSERVERS believe that true DEC-IBM competition can occur only when DEC introduces a uniprocessor capable of 20 MIPS. A four-processor configuration would thus be capable of 80 MIPS, a competitive mainframe total.

"The prices were quite comparable," but support was a major issue, the official says. "IBM's pitch was that we are an IBM shop [with a 3080] and support would be easier to arrange."

However, IBM couldn't promise support for a third party's software product, he says.

He turned down IBM's System/36 Model 5363 for a Microvax running Smartstar, a database program from Signal Technology, a DEC CMP vendor. IBM tried to have the bank reconsider after the announcement of the AS/400, but it was too late, the manager says.

Spurring them on

Monosson, who recently changed the name of his newsletter from "Monosson on DEC" to "The Monosson Report on DEC and IBM" because of the increasing interrelatedness of the vendors, says users must encourage the two firms to compete. "If the user goes with either all-DEC or all-IBM, then he doesn't benefit."

Responding to the question of cost-cutting, Rick Case, DEC's director of competitive marketing support, demurs, saying only that "it's very competitive out there. In any sales situation, deals may be made." He does not believe, however, that DEC is being specifically targeted by IBM with highly aggressive discounting.

However, last July, IBM formally announced a 9370 competitive installation offering in which new customers were to be given a 15% discount on a 9370 if the processor displaced a non-IBM device.

Grudge match

Randolph traces the roots of the present rivalry to 1983, when DEC, on the heels of a disastrous fiscal quarter, re-thought its strategy. To rapidly increase its growth, DEC determined, it would have to sell to commercial accounts through a direct sales force.

It would also have to use more advanced marketing techniques, including heavy public relations initiatives in courting the press and analysts, a consultant relations staff and formal rollouts, Randolph says.

DEC also hired numerous former IBM employees. Case acknowledges the hiring pattern but says that having worked for IBM does not guarantee an applicant instant employment at DEC. Employees from IBM do bring with them information about the rival company. But, Case stresses, "We never ask the person to divulge IBM proprietary information."

Frequently, IBMers suffer culture shock. "IBM is very structured; you know what your job is. At DEC, you make your own job. For people who are self-motivated and driven, it's excellent. To some highly structured people, it can appear to be chaos," Case says.

Once at DEC, IBMers confide in their new employer what IBM perceives as its weaknesses. Case says they often criticize DEC salespeople for not selling "high enough" in a customer's organization. IBM salespeople, on the other hand, seek to sell to the highest possible official in the customer's organization. IBM workers also say that DEC's lack of a true mainframe is a problem.

Weaknesses

The same employees point out the Achilles' heels of their former employer: the large staffing needs required by IBM processors; complex system software; and functional gaps, such as peer-to-peer networking.

Case acknowledges that IBM's practice of announcing future directions and intentions, such as statements on the Application System/400 far in advance of its announcement, is irksome to DEC. "IBM marketing messages have an impact. Some customers take that promise and act upon it." However, DEC can also divulge its intentions to customers under nondisclosure agreements, he says.

Last fall, IBM raised the rhetorical pitch when it issued a press release proclaiming that it had displaced "clustered minicomputers" at Reebok International, Ltd. in Canton, Mass., by installing a 3090 Model 120E mainframe. Analysts noted that the Reebok account became a refrain for IBM in sowing doubt about DEC equipment in high-transaction environments.

"You can find one Reebok account, but you can have hundreds that went the other way," Case says. "We would not issue a press release, however; that would be negative."

In March 1987, IBM issued a glossy brochure showing the results of Ramp C benchmark tests performed on a variety of machines. DEC held its fire for more than a year until it could provide a vastly improved transaction-processing package. It then unleashed a white paper supporting the Debit/Credit transaction-processing benchmark along with benchmark results for the systems of several vendors, including IBM.

"DEC GOING INTO the mainframe market is like Napoleon's march on Moscow. The cost in resources would be extreme, and once there, it would not be worth it."

JOHN LOGAN
ABERDEEN GROUP

"What IBM did with Ramp C was classic. It's like conducting a scientific experiment where you use a yardstick that no one else is using," Case says.

IBM would not comment on this or any other questions about its rivalry with DEC.

High stakes

Many observers believe that true DEC-IBM competition can occur only when DEC introduces a uniprocessor capable of 20 million instructions per second (MIPS). A four-processor configuration would thus be capable of 80 MIPS, a competitive mainframe total.

Nonetheless, the mainframe business is a market that DEC wants to be in. "We want to be the best in the mainframe business," Olsen said at the rollout of the 8800 series earlier this year. The 8800 models, which can perform up to 22 MIPS in a four-processor configuration, will likely be enhanced to achieve higher performance in the coming years. But analysts are skeptical of DEC's mainframe thrust.

"DEC going into the mainframe market is like Napoleon's march on Moscow," says John Logan, vice-president at the Boston-based Aberdeen Group. "The cost in resources would be extreme, and once there, it would not be worth it."

Even if DEC doesn't succeed in its mainframe quest, sharing the spotlight with IBM is a prize DEC's rivals of former years — Data General Corp., Wang Laboratories, Inc., Prime Computer, Inc. and Hewlett-Packard Co. — cannot claim. •

DEC VIEW

BY GLENN RIFKIN
CW STAFF

Though DEC is listed among the 100 best companies for women to work at in America, there are only two women among the more than 40 corporate officers. Rose Ann Giordano, who became in 1984 the first woman vice-president and corporate officer at DEC, refuses to get embroiled in a discussion about the potential for women at DEC.

Giordano admits that she and Ilene Jacobs, DEC's vice-president and treasurer, get a certain amount of attention because of their lofty positions in this male-dominated company. Mostly, Giordano looks forward to the day "when this becomes a non-issue."

In January, Giordano will celebrate 10 years with DEC. For the past five, she has been in charge of working with industry analysts and consulting firms as well as marketing to the MIS community, a job that has changed dramatically.

DEC, she admits, had little interest in the MIS community when she started. But during the company's resurgence through much of the 1980s, DEC has turned more attention to the commercial markets and the corporate data center.

Giordano claims that DEC was always successful marketing to "lines of business" but needed to address the MIS manager with greater intensity. She points out that the battle lines between the end user and MIS are disappearing as MIS begins to view its role as one of controlling the infrastructure of the information system rather than ruling every piece of computing equipment.

"IS leaders now understand that they don't have to have everyone working for them to have control."

Rose Ann Giordano
Vice-President

"Leaders of IS now understand that they don't have to have everyone working for them to have control," she says. "It can be a win-win situation for everyone if it breaks down into the areas of natural expertise."

Giordano is expanding her unit constantly and has hired a group of former MIS directors to work in sales and marketing to the IS community. "They are more consultants than sales people," she says. "It really helps within our culture; we get the expertise and then clone it."

DEC has clearly gotten the attention of the MIS director as it heads into the '90s, Giordano says. "There's a general awareness that we present an alternative. Nobody wants 10 vendors in their shop, but nobody wants one, either."

As the next decade unfolds, Giordano believes, DEC's culture must absorb outsiders and be open to change. There are plenty of long-timers to preserve the vision and culture, but the new faces bring needed diversity and freshness of ideas.

"The processes get more important as you get bigger and bigger," Giordano says. "We have to keep groups small enough so we don't lose the creativity and the personal touch. We constantly fight against the bureaucracy. You need to keep breaking it down."

Giordano doesn't speculate on her own future. "If things get static and predictable, that would stifle me. But at DEC, I know there will be opportunities in three years that I can't even fathom today."

FROM WALL STREET TO SNAKE OIL — OLSEN SPEAKS OUT

P. CHARLES LADOUCEUR

"In many areas we want to look like IBM, and we measure ourselves against IBM. For years we have set them as the model."

As DEC heads into the 1990s, Ken Olsen remains the symbol of his company — the leader, the conscience, the spokesman. Digital's president recently met with *Computerworld Extra* Editor George Harrar and Senior Editor Glenn Rifkin to discuss the future of his enterprise.

What is your expectation of the size of DEC three years from now?
We never predict the future. We obviously have to plan the next year in detail, but we don't have ambitions for growth. We try to keep our ambitions oriented to doing a quality job and let the growth come from that. It sounds trivial and insignificant, but it really makes a big difference.

What areas do you need to either pay new attention to or put greater emphasis on in order to maintain growth?
Growth isn't the goal, so we don't put it that way.

What would you substitute for that word?
There are certain things we should do for the customer that are important. The things we like to do are the things that no one else can do or can do well. There is no point in us doing those things that anyone can do. There are a number of things that we have set about to do. We have invested a lot in the area of transaction processing. Some people think that's not a fast-growing area and not exciting, but it turns out that . . . it's the fastest growing.

From IBM's point of view it might not mean 25% growth, but from our area, the growth in it is so big.

Isn't contributing something unique getting more difficult as you approach the '90s?
No, there are more areas for us now. To the casual observer — the press, which won't listen, or the financial community, which doesn't listen at all to anything over next week's profit count — it may not seem so. But transaction processing, for example, isn't a goal in itself. It's the key tool to many interesting applications. And most of them involve networking. It's our approach to networking that gives us an advantage. There is just no end to these areas.

Can you give us an example?
The key ones we're going after I don't want to mention at all. The dull ones I can't remember, and you don't want to hear them. The press keeps asking people for their strategy, and often people give their strategy. But your strategy is how you're going to fight the competition. If you really have a strategy, the last thing you want to do is tell the press.

And you do have a strategy?
In each different area, yes. Strategies should take into account a lot of alternatives as things happen.

Apparently during the Civil War, the North had all kinds of trouble with the press, who were free to roam and talk to everybody, and they published the strategy before the attack. The Southerners knew what general, how many soldiers, how many guns, because the press got hold of the strategy.

We think relationships between the military and press are bad today; it was much worse in those days. The generals used to say their biggest enemy was the Northern press.

Do you see business in military terms?
Sometimes yes, I guess often. You can always find examples to prove any point, no matter which side of the question you are on.

Do you read about successful military ventures?
I just happen to pick it up sometimes. There are often stories that bear on what we're doing, both the stupidity of generals and the wisdom of organizations.

We're not out to kill anybody. But in warfare you need enthusiasm and courage and spirit and esprit de corps, and there are great examples where that was the key to victory. Then there are examples of people who wanted to win with that only and were absolute failures.

Bonnie Prince Charles was being attacked by the English; he was going to win with sheer Scottish courage, enthusiasm, without food and ammunition. The soldiers were hungry and cold. It didn't work out.

At a recent product announcement, Ultrix was described as being on an "absolute equal footing" with VMS. That seems to be a shift from what was total support for VMS.
We said formally several times in the last few years that we were going to treat them with equal enthusiasm. But when all the facts were laid out, when you want to do a job, except for simple things, VMS was the only way to go.

VMS has an enormous background in customers and software and ease of use and is itself transportable. And with all the software on it, it was very hard to get a

If You Develop Software Applications On VAX,

story which our own salesmen would believe. About 10% of our sales were Ultrix-related. They were in a category of somewhat simple things. So the idea is not new.

It's just that when we came to any particular job — with some exceptions — VMS would win hands down. So we said it, but we didn't believe it. Now with the onset of OSF [the Open Software Foundation], we did make the commitment to work hard in order to have a system that meets the OSF standards. You know, the snake oil story on Unix was really very carefully stated, and the press just refused to listen.

The statement I made, and I did this very slowly, was that in order to make something transportable, you had to meet standards for every item that was used in that software.

You had to follow the standards in your language, had to have the same interface. The standard that we and OSF are using is X Windows. If you had any communications, you had to have a communications protocol. And there's the hardware communications that you built into the system and followed religiously. If you had an interface with a database, you had to have a database standard and religiously follow that.

If you believe you are going to have something transportable and don't have standards in everything you use and then follow them religiously — you believe in snake oil.

Well, apparently 90% of the press believes in snake oil. Somehow they believe that if you put [in] Unix, miraculously all of these things happen.

And, of course, the press never thought of checking whether it really happens. If you have four Sun systems, will the same software play on all of them? They never asked that question, never asked what it costs to take something from someone's Unix to somebody else's Unix. It costs a fortune.

Without OSF, the dreams of Unix-type software were hollow. That's not saying anything negative about it. The nice thing about Unix was that it was undisciplined, free, and creativity was rampant.

That is why so many good things were done, and that is why we supported it. But if you promise big systems out of it, then you better be disciplined and have standards.

What is your message then?

We believe there are three important things that a company is interested in. One is, everybody in an organization around the world has to be able to share work — results, pictures, data — regardless of who manufactured the operating system they're using. They've got to have access to databases. They have to pass mail, pass documents, purchase orders, and everybody has to follow standards.

And OSF has made a list that's absolutely critical for the world. One of the things we offer with VMS and VAX is a set of standards religiously followed, and we can offer that today. To say that if everybody wrote in Unix that would happen, that's snake oil. It conspicuously will not happen. It's not a matter that Ken Olsen is behind the times and he's against this modern new thing, Unix.

Next, what we want and the customer wants is to make it easy to transport software. The reason we want it is that if IBM has an application written by a third party, we want that third party or ourselves with very little effort to make it work on our system.

No. 3 is to have exactly the same software play on anybody's machine. [But] to make it absolutely transportable is way down on the list, and we may never get there. Any software should have at least the first two.

What does this mean for VMS vs. Unix in the '90s?

Now the question is, to what degree will this compete with VMS? It's clear that with certain applications which take a lot of high-speed computing and don't have an awful lot of communications going on, the Unix-type machine or a RISC computer has enormous advantages. When you get to a point where the system is bigger and the cost of the system and the speed of the system are in the communications and the disk and memory, it gets to be a wash between the two. Which computer is used is unimportant.

In those cases, the question of which system to use will depend on what the customer wants and where the best software is. VMS will always have the best software, the best CASE tools, the easiest to use — 14 years will be awfully hard to catch up on. But in a sense, we don't care. We put big effort into both of them.

How does RISC fit into DEC's strategy?

Our very large machine that's going to come out sometime next year has probably everything we know about RISC built into it.

We don't believe in mysteries, like the press does, that RISC is a religion, Unix is a religion, and you have to have absolute blind faith in it. They [the press] don't have any idea what RISC is, no idea what Unix is. With RISC, the machines we build, we know exactly what it is.

RISC chips playing Unix can do very high-speed computation very inexpensively. This is important in those areas which are compute-limited, like on a workstation. In those applications where you really want the speed and the computer is a major part of the cost, RISC is very useful. For the very large systems, there are so many other factors that enter in. Some people think that MIPS are the only things that count, that if you have enough MIPS in a tabletop machine you're going to replace the big mainframe. It should be obvious to people it doesn't work that way.

It takes a pretty naive reporter to come to that conclusion. The things that make a difference are the disks and the speed of the disks, the communications and the speed of the communications, the speed of the memory, the size of the memory and how the memory is handled and the nature of the problem you are solving.

People did the same extrapolation when PCs came out — if you have 100 PCs, you have as much computing as the mainframe, and they wanted to replace the mainframe. But they didn't.

DEC's recent success has been built on the message of "one company, one strategy, one message." Do you think that placing Ultrix on an equal footing with VMS and things like RISC are changing that message and could

Or IBM,

Or Both,

Also, today the stock market, in our case, is overwhelmingly funds, which are not interested in the day after tomorrow — just today. They don't believe in investments for the future, and we're now making major investments in desktop devices and high-end TP business. Desktop should pay off next year and TP slowly increase over a period of years.

These are terribly exciting, but the financial community isn't interested at all, doesn't have the slightest interest about next quarter. They'll buy in the morning and sell in the afternoon. We're religiously in completely different beliefs. We're doing better than anyone else in the industry. The products coming out next year and the rest of this year look really great, more exciting than we've had, but the financial community has no interest in them.

> "WITHOUT OSF, the dreams of Unix-type software were hollow. That's not saying anything negative about it. The nice thing about Unix was that it was undisciplined, free, and creativity was rampant."

How does the economy currently affect DEC's customers?
The interesting switch after Oct. 19 from our point of view is very clear. Customers went from large systems to a lot of small things. I think somebody had the explanation — which sounds right but maybe is a little too simple — that they clamped down in their organization on big expenditures, which you have to have all kinds of approvals for, but they didn't have controls over small systems. So we're overwhelmed with workstation orders and struggling to get big orders.

Does the loss of half your stock value since last year affect your ability to raise money or affect you in any other business way?
No, we don't need to raise money. We've gone through this since the start of the company, because there is always something more glamorous out there that claims more or does things without all the discipline, care and consistency. But if you look over 10 or 20 years, it has been surprisingly consistent on the way up.

Wouldn't dividends make the stock more attractive to small investors?
Yes, and we should consider it again. When the stock is down, it seems like a pathetic attempt to do something about the stock, and I'm sure it wouldn't be received very well. But we keep saying we need that money for when the message be confusing to customers?
That part we faced several years ago when we said our Ultrix and VMS were on equal footing. From our point of view, having two is a message. There is no conflict. We go through major changes every year in everything we do. It's the business we picked.

Are you going to keep the "one company, one message" theme?
The problem with that is not in the words; the problem is that after awhile you get tired of the themes.

Can you give our readers a hint of the new theme?
No, but if you have any ideas, we can try them out.

How do you see the IBM-DEC competition playing out in the '90s?
I must admit that I do look at the stock. If we go down, I like to see that the industry goes down, which is IBM also. Because I would hate to see us go down when IBM doesn't. Other than that, in individual areas, we don't want to lose against IBM, but our ambitions are not related to the size of IBM. We have no ambition to be one-third, or one-half or equal. We want to do a better job in specific areas.

But IBM is now turning the big ship around, and in the '90s, when they get things in place . . .
I didn't say we didn't take them seriously as an opponent. We take their size very seriously. We just don't fix our ambitions to be a certain percentage of theirs. In some ways, we like IBM and we wish them well, but just not in the areas [in which] we compete with them. They are good competition. And they are disciplined in their products, so they are easy to work with . . . well, maybe not easy, but it's possible to work with them.

That range of areas where you don't compete with IBM has grown increasingly smaller in the last few years.
Yes. Don't ask me what those areas are now, I'd have to think too hard. The attitude is the important thing. Our attitude is not to compete with them as a company but in individual pieces.

Is there a single area that concerns you about having to compete with IBM? Something you would like to do better in the '90s than you have done?
People often ask us, 'Is there a danger that you look like IBM?' I say, in many areas we want to look like IBM and we measure ourselves against IBM. We very carefully measure ourselves as to the quality of our service and sales and the reliability of our equipment and our skills in integrating systems. For years we have set them as the model and measured ourselves against them.

When you measure yourself against IBM, how do you judge yourself right now?
From the measurements we can take, we come very close. Sometimes we're a little ahead, sometimes a little behind.

Why does the stock market seem to have so little faith in DEC stock?
Partly because we're dull, we don't promise to kill IBM, we don't promise we're going to revolutionize the world with a new product. We tend to wait until we have a product and then announce it, and we don't do exciting things that the stock market loves.

You Should Use Cincom Software.

Now! SUPRA Available For VAX and IBM.

Cincom's SUPRA™ high-performance relational data base and the MANTIS® application development system are compatible across Digital VAX™ and IBM® environments. They allow you to choose the appropriate hardware, or combination of hardware, required to best meet your business needs—yet build only one software solution for all environments. For more information, call us today at: 1-800-543-3010 (In Ohio, 513-661-6000; In Canada, 1-800-387-5914).

CINCOM

The Better The Solution, The Better The Value.™

Cincom World Headquarters, 2300 Montana Avenue, Cincinnati, OH 45211.

digital™ Cooperative Marketing Program

VAX is a trademark of Digital Equipment Corporation. IBM is a registered trademark of International Business Machines Corporation.

really gets across and we're really going to grow. But when things recover some more we ought to consider that again.

So are you actively considering it now?
No, I wouldn't consider it now. The financial community is after us on this, asking for a nominal dividend. We obviously have the cash.

When you look into the '90s, can you give us a sense of the personal and management style you would like to see in your successor?
I'm probably like everyone else in my position — I like to think that there is never going to be anybody else. They'll probably have to kick me out. Like others in my position, I probably think [my successor] should look like me, but of course they never will.

They'll probably have to drag me out kicking. I always said it wouldn't happen like that to me, but it often happens.

Will that person come from within DEC?
More than likely, they often do, you know. Of course, the directors will be very active in these decisions.

Should the next president of Digital have an engineering background, like you, or would a marketing background be better?
In our business, we are product oriented. The person should be very strong technically. He could be a marketer. His education isn't the key part, but he should be a product person. I always like to think that calculus and physics help.

You have made announcements with Apple Computer, Inc. and Compaq Computer Corp. that show you are taking a broader view of the desktop; however, many industry analysts believe that DEC must have a strong product there. What is the outlook?
That's nonsense. We're into too many things as it is. If we should be criticized it's for being in too many things.

Our claim is that we don't have to own that device, we don't have to make the robots or machine tools; in the office, we don't have to make the personal computers. We may come out with a personal computer soon just because there is now a demand which we didn't see before.

But that is almost irrelevant to the main strategy of the company, which is that in each of the departments, we'll tie anybody's equipment into it. We want to run the whole company.

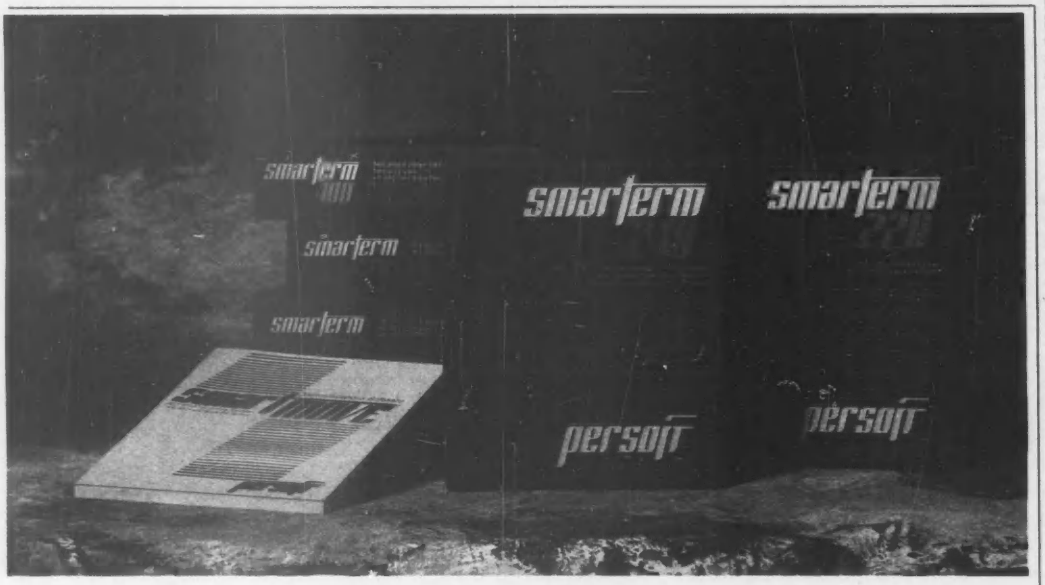
The tenets you have woven into the fabric of this company are well known — honesty, integrity, doing the right thing. How do you ensure that those tenets are kept as the company looks ahead to 200,000 employees and $20 billion in revenue? Will the company lose those values?
Probably the ones that are clear we won't. When I was a kid, I saw all the things wrong with my father. It wasn't until I had kids that I saw the things that were right with my father.

Right now, the things we are doing well or not doing well probably we don't identify as really important. Those are the ones I worry about.

The ones we can identify with and write down, we'll probably save those. Most of them are obvious; most people say they do them anyway. Hopefully we try harder at it.

The trivial thing, which you say easily but often doesn't work out easily, is always treat the customer the way you want to be treated. It's just so easy to put the red tape first. That's the kind of thing I fear us losing. We do our share today of sticking with red tape, tell the customer we have to go along with red tape, when that is really foolish.

That's the thing we have to keep working at. The best of intentions don't take care of it. Anybody who says he has arrived in ethics or morality, he's in trouble. You don't arrive; you keep working at it. If you ever admit you're any good in these areas, you are in trouble. •



Emulate The Best With The Brightest.

There's no denying the availability of some outstanding dedicated terminals to access Digital,® Hewlett-Packard, and Data General® host systems. Which makes the task of precisely emulating the performance of those dedicated terminals on an IBM® PC or compatible a rather significant challenge.

Based on the feedback we've received from SmarTerm® users, our family of terminal emulation software has met the challenge, passed every test, and surpassed, in the opinion of a host of enthusiastic users, the performance of the host system terminals being emulated.

The reasons why we shine are fundamental.

Every SmarTerm emulation is precise. So precise, in fact, that a dedicated terminal's SmarTerm counterpart fully emulates not only advanced performance features but also unique terminal quirks and bugs.

Every SmarTerm emulation is easy to use. It's one thing to make software do what hardware does. It's another challenge to minimize software's human wear. The people designing our products understand the nature of the people using them.

Every SmarTerm emulation is easy to learn. These days, training costs are a hot topic. Software intended to boost overall system efficiency must recognize the value of learning speed. We have.

It's also easy to learn more about how SmarTerm emulations can help you shine. Your software dealer can supply all the details. Or you can contact us at (608) 273-6000 to request complete specifications and a demonstration disk of the SmarTerm emulation that precisely matches your requirements.

persoft•

© 1988 Persoft, Inc., 465 Science Drive, Madison, Wisconsin 53711 U.S.A. Persoft and SmarTerm are registered trademarks of Persoft, Inc. All Rights Reserved. IBM is a registered trademark of International Business Machines Corporation. Digital is a registered trademark of Digital Equipment Corporation. Data General is a registered trademark of Data General Corporation.

Circle Reader Service Number 8

IN A VAX WORLD, PDP-11 SOLDIERS ON

But those who tend the line expect little glory

BY ALAN RADDING

In the glamour world of emerging technologies, Richard Mollin's job doesn't get much attention. As DEC's Micro Systems Development Program Office manager, Mollin is charged with overseeing the PDP-11 line — products based on an 18-year-old technology long ago eclipsed by the VAX.

Recognizing the lack of respect, Mollin patiently explains that if the annual hardware, software and service business generated by the PDP-11 were broken off from DEC, the separate company would rank approximately 300th in the Fortune 500 list of America's largest companies. "We'd have over $1 billion in revenue," he says. "We'd be bigger than a lot of other major computer companies."

Sales of PDP-11 products have remained stable for the past three years. This year the line accounts for roughly 10% of DEC's revenue, but that percentage will continue to shrink as sales of VAX products continue to expand.

The PDP-11 is living off of its existing customer base. Since 1971, DEC has sold approximately 500,000 processors, but the machine no longer attracts many new customers. Although for some applications the PDP-11 may still provide better price/performance, "the higher percentage of new business goes to the VAX and Microvax," Mollin concedes.

The PDP-11 is living off its existing customer base.

The machine remains popular on the factory floor and within the medical and education industries, says David Eulitt, market analyst at Computer Intelligence Co. in La Jolla, Calif. Discrete and process manufacturers make up 29% of the PDP-11 customer base. Medical and education users account for 30%, and the wholesale and retail industries account for another 10%.

The PDP-11 is neither a small VAX nor some closely related VAX predecessor. In a company that has stayed true to the religion of one architecture, the PDP-11 is an anomaly. The PDP-11 is a 16-bit machine, while the VAX is 32-bit. More importantly, the PDP-11 offers four different operating systems, with RSX being the most popular. The rest of the company has vehemently insisted on a single operating system, VMS — although now DEC is giving considerable billing to Ultrix, its Unix system.

Smaller sites

The PDP-11's appeal is primarily within small organizations. According to comparative data collected by Focus Research in Hartford, Conn., 73% of the PDP-11 sites are organizations with less than $5 million in revenue; 48% of VAX sites are organizations in that revenue range.

The primary objective of the PDP-11 group is to keep these smaller customers in the DEC fold. So much of the current development work is not on PDP-11 products themselves, but to ease the transition to VAX when the user is ready to upgrade.

The company provides compatibility guides for programmers if the customer wants to undertake a straight conversion from one machine to the other.

A more popular upgrade option is based on a coprocessor product that plugs into the Microvax and allows the machine to run PDP code. "They can use this as a transition or they can continue with a dual processor," Mollin says.

Moving from the PDP-11 to the Microvax through coprocessing is the most popular route for users, and the PDP-11 group is developing more software to make that upgrade path easier.

Altus Savings Bank in Mobile, Ala., is going through the conversion process now. The mortgage department ran four PDP-11s connected to the main VAX system. "The PDPs are real good machines, but we hit the limit on capacity," says Systems Communications Manager Raymond Benavides. "You can only run so many users."

To get more capacity, the bank is moving its applications from the PDPs to its VAX 8700. A straight software conversion is being handled by the third-party vendor that provided the original mortgage applications. DEC support for the PDP has been good, Benavides says, but the time to move on clearly has arrived. Now the bank has to figure out what to do with four PDP-11s. "They're just sitting here," he says. "We're probably going to try to sell them."

The PDP group keeps developing PDP-11 to the point where the machine shares many of the same components, such as the Q-bus, with the Microvax, Mollin says. Manufacturing is handled at plants in Knata, Canada and Valbonne, France.

Increasingly, more mainstream DEC products are cutting into the PDP-11 turf. "Any new VAX product, particularly at the low end, impacts the PDP-11 customer base," Mollin says. The Microvax and the widely speculated upon desktop VAX, in particular, represent strong alternatives to the PDP.

Rather than battle against the growing tide of low-end VAX/VMS products, Mollin is committed to helping customers switch. "We work with the VAX people so we can alert our customers to what is coming," he says.

Within the Micro Systems Development group, the PDP-11 is given the attention of development and support resources in proportion to the percentage of DEC business that it commands, Mollin notes. The PDP-11 group manages to attract some young talent, but Mollin concedes that "other parts of the company offer more glamour."

Sometime the PDP-11 will be discontinued, Mollin knows, but he doesn't expect the product death to happen in the foreseeable future. For now, he says, "This is still a very viable business with a large customer base and active purchasers." ●

The PDP-11 still generates *enough revenue to be a Fortune 500 company, Mollin says.* P. CHARLES LADOUCEUR

Radding is a Boston-based author specializing in business and technology.

ASK DEC

What is DEC doing about the issue of compact storage? We're looking for storage in the forms of either high-density tape drives or CD-ROM. Does DEC plan on cost-effective storage, which will reduce time and quantity and protect our backup?

Marianne Kingston
Chief of Operations
U.S. Department of the Treasury

Digital has been an early and active participant in the industry-wide migration to compact, high-capacity cartridge tape drive subsystems. Digital's TK50, introduced in 1985 with a 95M-byte capacity, was the first low-cost ½-in. cartridge drive in the industry. This leadership position was continued with the introduction of the second-generation 296M-byte TK70 in 1987. Digital is continuing to develop additional cartridge tape subsystems, which will provide both higher capacity and higher performance to meet the growing needs for data backup on Digital's full range of systems.

Along with these new tape subsystems, DEC this year introduced the Storage Libary System software to facilitate file backup and media management on our VAX computer systems. This is the first of a series of ongoing software projects that will increase efficiency and reduce time requirements for handling all aspects of data management.

This past December, DEC announced the availability of the VMS operating system distributed on CD-ROM disks. More recently, DEC introduced the RV20 Write-Once Optical Disk subsystem.

Bruce Gordon
Product Management and Marketing Manager
Storage and Information Management Tape and Optical Products

We are a large IBM shop and we want to integrate Digital in our communication facilities. Based on experience to date, it is our perception that it is extremely difficult to integrate Digital communication facilities with IBM/SNA networks in a cost/performance-effective manner. Any comments on this problem?

Jack Crawford
Assistant Vice-President
The Hartford Insurance Group
Hartford, Conn.

In all cases, Digital's IBM interconnect offerings appear to the SNA network as standard IBM PU devices. Integration of the two environments is no more difficult than any other standard device to the SNA network.

The Decnet/SNA Gateway program, first introduced in 1982, was the first commercially available internetwork gateway in the industry. Since that time, Digital has expanded the number of end-user functions (3270 emulation, RJE, document exchange via DIA, SNADS, Profs, 3270 access to Digital systems, distributed applications, videotex access by 3270 terminals) and application programming interfaces (API, 3270 data stream, APPC/LU6.2), providing a breadth of functionality not available from any other vendor.

Digital has even gone to the extent of developing and supporting the IBM host-resident code that extends Decnet services to 370-class systems, via the Decnet/SNA Data Transfer Facility.

In addition, the transport product family announced in August provides flexibility in connectivity options for the Digital/IBM environment. The high-end offering, the Decnet/SNA Gateway-CT, provides customers with the highest speed connections available today, through a direct channel attachment, which allows users to integrate their Digital and IBM environments. The Decnet/SNA transport family offers users a variety of connection options and different levels of concurrent session support, allowing them to start small and grow. The Digital Decnet/SNA Gateway offerings appear to the IBM/SNA network as standard devices and do not add any more complexity in operation, installation and support than any other IBM device.

Bob Murray
Director, Networks and Communications Marketing Group

What effect will IBM's Systems Application Architecture (SAA) have on Digital's DEC/IBM interconnect product set?

William Koppelman
Assistant Vice-President and Director of DEC Data Center
Moody's Investor New York

SAA will not affect the DEC/IBM interconnect product set in any direct way. The purpose of the product set is to allow customers to bring existing IBM systems and applications into an enterprisewide OSI network.

The particular interfaces and protocols supported by the interconnect products are those that solve current, real customer problems, rather than those that fit into some hypothetical future architecture.

In the future, if significant customer systems and applications employ the SAA interfaces and protocols, Digital's interconnect product set will support them. Indeed, if SAA is successful in standardizing interfaces and protocols, it will make it easier for Digital to connect to the IBM environment.

Bill Strecker
Vice-President
Product Strategy and Architecture

We are just finalizing plans to install a computer network based on Decnet and a VAX to some of our scientific staff. As a newcomer to the world of Digital, we were somewhat frustrated dealing with a sales and marketing staff that seemed to be used to dealing with more technically competent customers.

Is there a strategy within DEC to improve this service, especially for the customer whose needs are overall concept planning and help in driving a new strategy within their enterprise?

William Lopatin
Director of Scientific Information Systems
Miles, Inc.
Elkhart, Ill.

Yes, Digital meets its customers' need for overall concept planning through our Enterprise Planning and Design Services. These services are supported by a worldwide staff of management consultants and industry experts. Digital consultants work with customer decision-makers to gain their alignment and consensus on key strategic issues. Through utilization of a customizable set of Digital-unique and industry-leading planning methodologies, our services are designed to address and link strategic business and technology areas.

For example, our recent enterprise planning work with a major manufacturing firm resulted in a strategic plan that was accepted at corporate and plant levels, was supported by cross-functional and IS management and was supported as well by union personnel. The plan covered long- and short-term business and technology strategies.

Dave Creed
Marketing Manager for Software Services

Does DEC recognize its responsibility to adequately support the multivendor environment regardless of whether an IBM, Apple or DEC system is the primary user entry point? Is DEC planning network monitoring and management systems that will be able to deal effectively with a mix of hardware and software from a single point on the network?

Thomas J. Reynolds
Associate Director of Research Systems
Hoffmann-LaRoche, Inc.
Nutley, N.J.

Digital does recognize its responsibility to support the multivendor environment through its enterprise networking strategy that addresses interoperability, connectivity, manageability and distributed applications. No single vendor can supply all the components required for every type of network. An effective enterprise management solution must be able to manage the multivendor environment using past management methods and products. Digital's newly announced enterprise management architecture eliminates the requirement for dedicated hardware or a centralized control system, yet provides for its implementation if desired.

Dave Korf
Director of Network Management Marketing

TCP/IP is an accepted standard on most Unix systems. What technical and administrative support will DEC be offering to sites that need to run both Decnet and TCP/IP?

David Durand
Systems Programmer
Brandeis University
Waltham, Mass.

Digital, through its educational services and field services, currently offers TCP/IP courses, as well as people trained in TCP/IP to support customer sites that need to run both Decnet and TCP/IP. Digital is the leading supplier of Unix-based systems. In fact, Digital was the first computer company to announce a Posix- and OSF-compliant Unix capability — Ultrix.

Digital has extensive experience in supporting the TCP/IP protocols through the VMS/Ultrix Internet Gateway; the VMS/Ultrix connection and the NFS file-transfer support for the VMS operating systems. In addition, Digital provides support for the Ultrix (Unix) mail systems, connection to the IBM environments via the SNA gateways and access routines such as Data Transfer Facility. At the ENE '88 event, the National Bureau of Standards demonstrated a TCP/IP-to-OSI gateway utilizing Digital hardware and software platforms.

Lee Sudan
Director of Enterprise Marketing

How does Digital plan to improve the quality of its software support? Hardware maintenance is very good. However, when there is a software problem, it takes a long time to get an answer, and then the answer is "It will be fixed in the next release."

Robert Wood
Computer Center Manager
Genrad Corp.
Concord, Mass.

The key to improving the quality of software support is communication and response to customers. We are improving the communication by increasing the accessibility of software specialists plus call screening of conformance issues at our Customer Support Centers (CSC). We continue to improve our efficiency in on-site directing, diagnosing and repairing. As a result, we're able to invest in more resources at our CSCs to address complex software issues. In fact, we close 80% to 85% of software calls remotely from the CSCs. We are also improving our standard software performance process.

Don Zereski
Vice-President, U.S. Field Service

In the new release of VMS 5.0, features Digital added seem to take away from the system's power and speed. What is Digital doing to correct this problem?

Richard Hagan
Supervisor of Information Services
Fenwal, Inc.
Ashland, Mass.

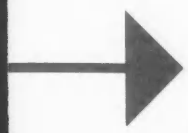
As in any major functional release of a software product, changes to existing functions and the addition of new features may affect the performance of existing components. In this case, you do not cite any particular area of concern, so I will try to provide some perspective on VMS 5.0 performance.

One area that should be considered is that of memory requirements. The new features in Version 5.0 increased the memory requirements by 0.25M bytes over that of Version 4.7. Should installation of 5.0 result in insufficient free memory, your performance will be less than expected. Although some low-level operating system functions may indeed by marginally slower, efforts were made to improve the efficiency of higher level services, resulting in system-level performance on par with 4.7's.

Many changes were made to VMS that substantially improve performance and enhance the power available from VAX systems. In particular, support for symmetric multiprocessing provides a major performance gain. Also, changes were made to the most frequently used file operations and print and batch services, offering performance improvements to a large variety of VMS applications.

Kurt Friedrich
Manager, VMS Software Engineering

Please Use This Card For Product Information



COMPUTERWORLD Extra

Reader Service Card
Issue: October 19/Expires: December 30, 1988

Name _____ Title _____
Company _____ Phone _____
Address _____
City _____ State _____ Zip _____

A. Please check the business/industry in which you work: (check one)

End Users
1 ☐ Manufacturer (other than computer)
2 ☐ Finance/Insurance/Real Estate
3 ☐ Medicine/Law/Education
4 ☐ Wholesale/Retail/Trade
5 ☐ Business Service (except DP)
6 ☐ Government - State/Federal/Local
7 ☐ Public Utility/Communication Systems/Transportation
8 ☐ Mining/Construction/Petroleum/Refining
9 ☐ Other User _____ (please specify)

Vendors
10 ☐ Manufacturer of Computers, Computer-Related Systems or Peripherals
11 ☐ Computer Service Bureau/Software/Planning/Consulting
12 ☐ Computer/Peripheral Dealer/Distributor/Retailer
13 ☐ Other Vendor _____ (please specify)

B. Please check your main job function: (check one)
1 ☐ Corporate Management
2 ☐ Financial Management
3 ☐ MIS/DP Management
4 ☐ MIS/DP Operations
5 ☐ Data Communications Management
6 ☐ Data Communications Operations

C. Reason for this inquiry: (check one)
1 ☐ Immediate purchase
2 ☐ Future purchase
3 ☐ Information only

D. Is this your personal copy of Computerworld Extra? (check one)
1 ☐ My personal copy
2 ☐ I'm a pass-along reader

E. Please check the number of employees in your company: (check one)
1 ☐ Over 1,000 employees
2 ☐ 501-1,000 employees
3 ☐ 500 or under

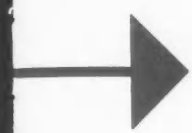
Circle the # that corresponds to the number at the bottom of the item in which you are interested.

1	21	41	61	81	101	121	141	161	181
2	22	42	62	82	102	122	142	162	182
3	23	43	63	83	103	123	143	163	183
4	24	44	64	84	104	124	144	164	184
5	25	45	65	85	105	125	145	165	185
6	26	46	66	86	106	126	146	166	186
7	27	47	67	87	107	127	147	167	187
8	28	48	68	88	108	128	148	168	188
9	29	49	69	89	109	129	149	169	189
10	30	50	70	90	110	130	150	170	190
11	31	51	71	91	111	131	151	171	191
12	32	52	72	92	112	132	152	172	192
13	33	53	73	93	113	133	153	173	193
14	34	54	74	94	114	134	154	174	194
15	35	55	75	95	115	135	155	175	195
16	36	56	76	96	116	136	156	176	196
17	37	57	77	97	117	137	157	177	197
18	38	58	78	98	118	138	158	178	198
19	39	59	79	99	119	139	159	179	199
20	40	60	80	100	120	140	160	180	200

☐ I have circled #200 on the Reader Service Card to enter my *Computerworld* subscription for one year, 51 weekly issues and 12 *Computerworld Focus* issues for $44 and please bill me later. This rate valid only in the U.S.

③

Please Fill Out This Card For Editorial Comments



COMPUTERWORLD Extra

READER COMMENTS

Name _____ Title _____
Company _____ Phone _____
City _____ State _____ Zip _____

1. Which articles or topics were most interesting to you in this issue? _____
2. What topics would you like to see covered in a future issue of Extra on IBM? _____
3. What are your most important management problems? _____
4. What are your most important technical problems? _____
5. What do you like most or least about Computerworld Extra? _____
6. Do you have any suggestions of topics for future special issues? _____

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 124 DALTON, MA 01227

POSTAGE WILL BE PAID BY ADDRESSEE

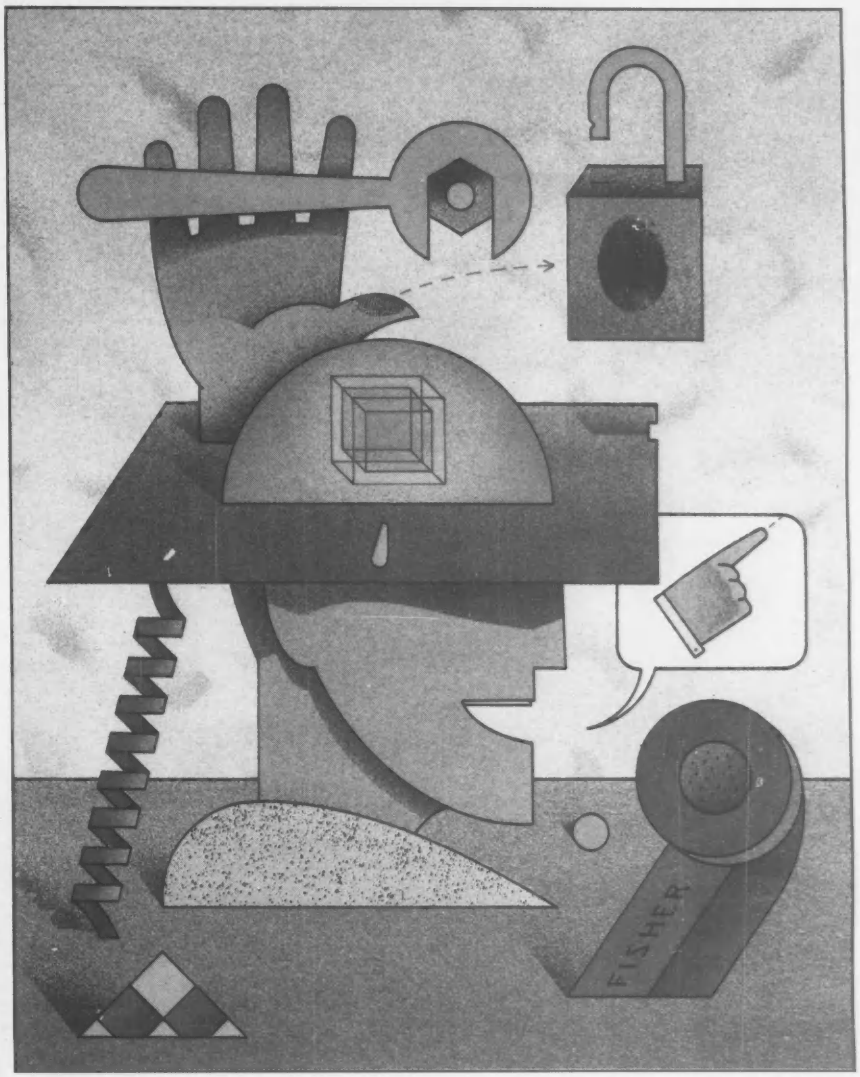
Computerworld Extra

Post Office Box 5112
Pittsfield, MA 01203-9930

Place
Stamp
Here

Attn: George Harrar
Computerworld Extra
375 Cochituate Road
Framingham, MA 01701-9171

KEEPING R&D IN THE HERE AND NOW



MARK FISHER

RISC, relational databases top research as DEC trades blue skies for pragmatism

BY AVERY JENKINS

From its roots in the research laboratories of MIT three decades ago, Digital's culture is grounded in the belief that spending heavily on R&D will produce the products it needs to compete. DEC spends more than $1 billion annually on research and development — which, by percentage, puts it among the top R&D spenders in corporate America.

DEC spends heavily on joint research projects at leading engineering universities around the country, such as Carnegie-Mellon University, MIT and Purdue University. It belongs to consortia such as MCC that are investigating advances in technology. And the company has quietly set up four applied research laboratories in the past six years to focus on the future of computing (see story page 26). But these labs concentrate on more basic ideas and leave the formulation of products to DEC's advanced development centers around the U.S. and the world.

And it is at these centers that DEC works at answering oft-asked questions such as "What next after VAX?" and "What is DEC doing about RISC?"

DEC's research efforts, in fact, are based on the pragmatic rather than the esoteric. "We are not investing in research for the sake of science," says Sam Fuller, DEC's vice-president of research. Unlike Bell Laboratories or IBM's Thomas J. Watson Research Center, DEC more narrowly focuses its attention on technologies with clear near-term potential.

Superconductivity and optical computing, for example, are not very high on the priority research list, Fuller admits. "There's clearly a lot of potential" in superconductivity, he says, "but there are so many problems to be overcome. . . . Applied research is not feasible. It would be irresponsible of DEC, though, not to be tracking it."

Among the areas that DEC is heavily involved in developing are the following:

• **RISC.** Reduced instruction set computing makes possible real-time, complex operations by streamlining processor command sequences.

"Since late 1982, DEC has had more than five internal and external development projects in RISC," Fuller comments. One project, he adds, has created 24 working prototypes of a RISC machine.

However, reports surfaced during the summer that DEC had scrapped at least some internal RISC development and turned to Mips Computer Systems, Inc. to provide the technology for DEC to OEM. Last month, DEC purchased 5% of Sunnyvale, Calif.-based Mips. DEC's own RISC project — code-named Prism — was partially shut down in July, on the heels of the earlier demise of the Argonaut program, which was developing a VAX capable of 10 to 14 million instructions per second.

On the surface, end users are not likely to notice whether DEC is using RISC or not, Fuller says, because this technology is not "a user-visible system structure." But the advantages Fuller sees in RISC are large. It would offer much lower overhead, with fewer levels of translation required to run the machine. Microcode could be cleaned up, and RISC would permit larger register arrays, Fuller says.

The problem, however, is ensuring upward compatibility. This feature has been one of DEC's hallmarks from the beginning — and one of its strongest selling points against its competitors. The changes a RISC machine entails create some difficulties in providing complete compatibility. Fuller says DEC wants to maintain 100% upgradability. "At the 80% level, it's easy," he says, as it requires only new language compilers that would support a RISC instruction set.

But anywhere from 5% to 20% of VAX applications are binary files, Fuller says, and these are the stumbling block for RISC compatibility. And that is what DEC is working on right now. "DEC has got a duty" to support those applications, Fuller says, "and we have got to find a way to do that."

Since RISC is not a technology readily visible to users, DEC's customers are in many cases not directly demanding RISC machines. But the improvements made possi-

Jenkins is a Newton, Mass.-based free-lance writer.

ble by RISC are the foundation of high-performance workstations such as the Sun Microsystems, Inc. Sun-4 and Apollo Computer Systems, Inc. Series 1000, both of which have cut into DEC's market.

The increasing use of compute-intensive computer-aided design, manufacturing and engineering systems, as well as the potential for RISC machines as workstation servers, all point to RISC as a technology that will play an increasingly important role in DEC's future.

• **Relational databases.** Few would deny that data bases are the bread and butter of computing, yet this technology continues to trouble DEC — particularly in competition with IBM.

IBM's DB2 is easily the fastest growing data base, and even though DEC's RDB/VMS is technically superior in some ways, according to Jeff Jacobs, relational database specialist and president of Consart Systems, Inc. in Manhattan Beach, Calif., the latter continues to grow at a much slower pace. In an attempt to catch up, DEC has formed a two-pronged attack that indicates its directions for the future — although the messages it is sending are somewhat unclear.

"DEC has invested a great deal of money" in performance improvements for RDB, according to Peter Schay, an analyst at the Gartner Group, Inc. Some of these improvements are support for SQL, the IBM-originated ANSI-standard interface, and several bridges or gateways.

DEC has also worked hard to improve the performance of its data base products. Part of the reason is simply to be competitive with other vendors' offerings. But it is also part of DEC's strategic push into on-line transaction processing.

OLTP is a growing market fueled by management techniques such as just-in-time inventory methods and by the increasing requirements of financial companies and health maintenance organizations for on-line financial tools. DEC's Application Control and Management System provides both a runtime system and application development tools, and Decintact is an IBM CICS-like OLTP monitor. Both of these products give Digital potential strength in the OLTP market.

But at the same time, DEC is also promoting products such as Oracle Corp.'s Oracle, a popular database that runs on a variety of hardware platforms, and VIDA, a gateway between VAX systems and Cullinet Software, Inc.'s IDMS/R running on IBM mainframes.

"In some ways, DEC's direction is not totally clear, since you have two competing products being pushed," Consort's Jacobs says.

Finally, DEC is promoting its support of distributed data bases through products such as VAX Data Distributor, which distributes data from any data base conforming to Digital's Standard Relational Interface. But that may be only a first step.

While all of these software products are important to Digital's status as a database provider, Schay says it is important to remember that DEC is, first and foremost, a hardware company. "We believe that DEC is developing a database machine," he says, although that product is not likely to appear until 1990 or later.

• **Voice technologies.** With the increasing size of storage devices, voice technology in recent years has become less of a gee-whiz phenomenon and more of a business tool. According to DEC's Paul Oakland, "There are three technologies that collectively form the voice processing environment": namely, text-to-speech, voice digitization and speech recognition.

> "WE ARE NOT investing in research for the sake of science."
>
> SAM FULLER
> VICE-PRESIDENT
> OF RESEARCH

Voice digitization has gained the most rapid acceptance in the marketplace. This technology converts an analog voice signal into digital form so that it may be stored in the computer's mass storage devices. Voice digitization is the technology that lies behind voice-message and voice-mail systems, two applications that are growing rapidly with the increasing use of automated digital private branch exchange (PBX) systems.

One of the problems with creating voice-mail systems is the need to be able to interface the DEC equipment and software with a variety of PBX systems.

With an adequate interface between computer and PBX, voice-mail systems can include voice message forwarding, which lets a user append additional comments to a telephone message and forward it to another extension on the system; and fully automated telephone systems, which all but eliminate the need for human PBX operators.

According to Oakland, DEC is working with most of the major PBX vendors to develop interfaces that will make voice-messaging systems more effective. DEC is expected to announce products in this area within the next couple of months.

While the other voice technologies do not have the immediate return-on-investment potential that voice-messaging offers, DEC continues work on them.

Speech output, or text-to-speech technology, has existed in the DEC line for several years in its Dectalk product. However, the market for speech output has not developed as rapidly as DEC had projected, Fuller says; he expects the company to maintain only a "moderate investment in this technology until we see it take off."

Oakland, however, says that speech output is finding a market with corporate employees who spend a lot of time in the field. Using speech output devices, field personnel are able to access corporate databases, inputting their queries via Touch-Tone telephones. Banking and financial services companies are also starting to use this technology to auditorially access information that previously required a computer terminal.

In the area of speech recognition, Fuller says that much more work needs to be done to make the technology acceptable, available and robust enough to provide the basis for applications. He adds that DEC research on this technology includes investigations into ways voice recognition can take place in areas with high ambient-noise levels. To do this, algorithms that can better discriminate between random noise and the human voice must be developed.

This ability would require expanding the rather limited vocabulary of current speech recognition devices. While a computer may recognize up to several hundred words, it recognizes them as independent, disassociated elements. The ability to recognize and interpret continuous speech, rather than selected elements, would make speech recogniztion much easier to apply. But, Fuller says, "It's not a major focus today — there are more people working on video screens."

• **Image processing.** In three to four years, says John Jiudice, applications systems marketing manager for electronic publishing at DEC, "Images will be a standard piece of information" on any DEC computer system.

Right now, says Joel Arker, DEC's image group base product marketing manager, "Even with the large investments businesses have made in computer technology, less than 10% of today's business information is computer-based." Much of the information that businesses use come in the forms of pictures, graphs and images. Image processing — the ability to input, as well as manipulate and output, nontextual data — would allow much more business data to be managed by computers.

Currently there is no standard storage format for image data, and this weak link is where Digital has targeted its image processing strategy. Other companies, such as IBM, have been slower to respond to this market need, and smaller firms, such as

DEC's Idea Seekers

BY GLENN RIFKIN
CW STAFF

On a busy Palo Alto corner across the street from the main entrance to Stanford University, DEC recently opened the doors of an unobtrusive new facility. Passers-by would be unaware that they were looking at a major research facility for the world's second largest computer company. But within the red brick and glass exterior, DEC researchers are vigorously pursuing the future of distributed computing.

Under the direction of Robert Taylor, a veteran of Xerox Palo Alto Research Center (PARC), the Digital Systems Research Center (SRC) has spent the past 4½ years recruiting researchers and piecing together a technical agenda that will help formulate the basis for DEC's future. And the agenda is not products but ideas.

As one of four DEC research facilities worldwide, the SRC focuses on just one aspect of the broader scope of the company's research. Two blocks away, the Western Research Laboratory looks at theories of high-performance computing; a lab in Paris concentrates on graphics and theory. A relatively new lab in Cambridge, Mass., is just getting started and has yet to set a clear focus.

Not just dreamers

Unlike AT&T's Bell Labs or IBM's research facilities, which have traditionally focused on basic research leading to critical breakthroughs such as the transistor, the first digital computer and television, DEC's four laboratories focus on applied research. While looking at a five-year horizon, these labs are attempting to advance technologies to a point where they can be turned over to product development teams.

"Our job is to look at a longer term horizon and explore distributed computing," Taylor says.

Throughout the facility, DEC's advanced thinkers sit at desks arrayed with home-grown workstations called Fireflies, which were developed internally and incorporate several powerful Microvax II chips within each system.

Michael Schroeder, a senior consulting engineer at the center, acknowledges that the research center must maintain a "delicate balance" between pure research and pragmatic questions about DEC's future. He insists there are strong "open channels" to the rest of the firm.

Among the center's major projects is looking at the impact of multiprocessing on distributed computing from both a hardware and a software point of view.

The group is also at work on a distributed file system, a system modeling project and other new hardware to merge into a distributed systems environment. There are several classes of machines under consideration — computer-room to desktop-level. In all, the center will focus on only two hardware projects at a time. "We don't want to do what's done better in an advanced development lab," says Taylor.

He adds that comparing the SRC to IBM's research facility is apples and oranges. IBM's researchers work in mathematics and physics, for example, while DEC researchers focus solely on systems theories. "We're not looking for Nobel Prizes; we're looking for an impact on the company," he says.

All of the SRC's projects are multiyear in nature, Taylor points out, and each has a handful of people assigned to it. But the researchers are ultrasensitive to the fact that they are doing applied research, not advanced development.

"We believe we are working on problems that if there were solutions out there today, DEC customers would profit from them significantly," Taylor says.

Among the big concerns: the seamlessness with which applications are executed in today's environment. Though DEC brags that it "has it now," Taylor points out that vast improvements in transparency will evolve in five to 10 years. "Digital does have it now, but we never said it can't get any better," Taylor says.

Taylor bristles at questions about the future of VAX VMS. Despite Ken Olsen's promise that everything will "plug and play" in future systems, Taylor insists that "we're more in favor of everything plugging and playing than Ken Olsen, but it is not particularly important that we do research in VMS and VAX. Ideas are what is important."

DEC VIEW

BY GLENN RIFKIN
CW STAFF

As vice-president of distributed systems, William Johnson Jr., is responsible for perhaps the most critical element of DEC's current offerings: communications and network products. B. J., as he is known, is the point man for major DEC announcements on networking strategy; in this role, he has become a visible spokesman for DEC.

Since joining the company in 1973, Johnson has witnessed a raft of changes. But, he says, "Chaos and serendipity still exist here. There's no rigor mortis setting in."

Johnson, 46, became a vice-president in 1982 and has led DEC's charge into networking throughout the 1980s.

"Three years ago, no one mentioned DEC when they mentioned networking," he points out. "Now we're the leader there. We were just a provider of iron. There's been quite a change."

Johnson says a dramatic change in the business world has increased competitive pressures on technology users. People want access to information anytime, anywhere, and deem networks utilities. DEC's mandate in the '90s is to provide connectivity, interoperability, distributed applications and network management.

"Chaos and serendipity still exist here. There's no rigor mortis setting in."

William Johnson Jr.
Vice-President
Distributed Systems

"It's critical for us to set the stage for our customers and how they will compete out into the '90s," Johnson says.

In his tenure at DEC, Johnson has seen the company grow by focusing five years ahead and letting next year take care of itself. "If we have the right vision, we'll be what the market lets us be," he says.

Despite DEC's stunning growth in the past several years, Johnson says the culture remains intact and that DEC heroes still exist — it's just a matter of where you look. He recalls that in the past, the heroes were "bullheaded and dogged" types who championed various products in DEC's chaotic product-line structure and thus were very visible.

The move to VAX was a move toward unified strategy, so current heroes like Bill Strecker, Bob Glorioso and Bill Hanson tend to be overshadowed by overall success. "You just have to make sure you have the heroes at the right time," Johnson says.

Wang Laboratories, Inc., have been unable to take advantage of it.

The company has developed and recently announced its own format, called Compound Digital Architecture (CDA), which Digital hopes will make it "as straightforward to handle images as it has been to handle text," Jiudice says. The format's specifications have only recently been published; they will eventually allow third-party vendors to develop applications to manipulate CDA-format data, which is the second key to DEC's imaging strategy.

The company is not only relying on internal development to create DEC's products for the 1990s but is working with Apple Computer, Inc., Eastman Kodak Co., Interleaf, Inc. and Aldus Corp. to create products. DEC is again looking at a five-year horizon for its CDA format to catch on.

DEC is assuring customers that they will have the ability to include features such as image manipulation, rotation and scaling, image optimization and image data compression for transmission and storage into their existing applications.

Fuller adds that not only the manipulation, but also the input or output of graphics data, is being developed by the company's R&D teams. And he predicts that the results are not too far away from the consumer. "Image processing is to me where voice technology was two to three years ago," Fuller says. "The key . . . architectures required to use images on an enterprisewide basis are now moving into place."

Closely allied with image processing and the CDA standard is desktop publishing. According to Woodrow Vandeveer, executive vice-president of Interconsult in Cambridge, Mass., DEC has used both its standard CDA format and third-party agreements to prepare itself for this market.

The corporate electronic publishing market could reach $1.7 billion by 1995, Vandeveer says, and DEC is not about to miss out.

And as it has with other technologies, DEC is preparing for the next decade by lining up outside vendors, such as Aldus and Interleaf, to provide VAX support.

• **CASE.** Computer-aided software engineering is an emerging technology alternately dismissed as this year's marketing buzzword and hailed as the wave of applications development in the future.

There is little doubt that software developers need some help. According to a study by Applied Research in New Jersey, 75% of all software projects are canceled before completion, largely because they have become obsolete before they were even finished.

According to Marc Sokol, executive vice-president of Cobol developer Realia, Inc. in Chicago, 10% to 20% of large development projects are using CASE tools. But CASE is still in its formative stage, and there is much disagreement as to what constitutes good CASE — and even as to how to define CASE itself.

Digital has to to address the requirements of a very diverse user base. It has released several important products promoting DEC's CASE capabilities. However, according to New Science Associates and others, more important products can be expected within the next year. Some market watchers are predicting that DEC will integrate a fourth-generation language (4GL) with its Cobol compiler and a graphics front end in a more tightly knit package.

Rather than try to meet everyone's needs with a single broad-based product — a virtually impossible task anyway — Digital's strategy is to provide multiple, closely linked tools whose net effect is to reduce development overhead.

"Our definition of CASE is very broad," says Tom Roberts, a marketing specialist in DEC's CASE program. Currently, most CASE products simply link a graphics front end with a 4GL or compiler to aid in the initial analysis and design of software systems. But as Digital sees it, CASE breaks down into two areas. The first consists of integrated tools for the initial development of new applications, and the second consists of the tools required for maintenance of software in the production phase — maintenance that gets increasingly complex as an application ages.

Roberts also outlines the second piece of DEC's long-term CASE strategy. "When we look in the future to solve the software development problems that people will have in the 1990s," he says, "you need a great level of integration." Integrated tools will help manage software development as it goes through the edit, compile and test loop. Development tools currently do not recognize the status of a particular set of code or its place in the overall program. DEC's CASE tools are in part intended to insert greater control in the process. Like artificial intelligence, DEC got into the CASE business as an internal user of the product. But unlike AI, CASE is not a tough technology to develop. "The hardest part of CASE is not products, but bringing the technology into the shop," says Cathy Hornbach, DEC's CASE product marketing manager. Programming is often regarded as an art, rather than a process susceptible to methodological management, and the benefits of CASE are therefore misunderstood.

• **ISDN.** No review of DEC's approach to technology would be complete without a mention of networking. The future of networking will rest, in part, with Integrated Services Digital Network (ISDN), a technology that will convert the largely analog telephone network into an all-digital system.

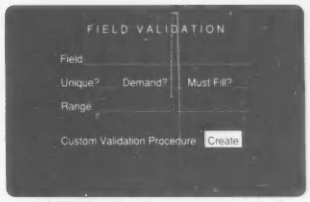
ISDN has been bandied about since 1978, but the first networks have been put in place only recently. Digital's Lee Sudan, director of enterprise marketing, believes ISDN will become a standard in the next few years.

ISDN will allow voice and data to be integrated at the application level, Sudan says, and DEC is working with vendors such as Northern Telecom, Siemens AG and British Telecom to be ready to provide such applications-level capabilities.

DEC is working on products that will provide the interface between ISDN telecommunications equipment and computers. The company has already participated in several ISDN trials, including one at Decworld 88 in Cannes, France. "ISDN, from our point of view, is going to give customers the flexibility of another high-speed transmission path," Sudan says. ISDN will supplement existing high-bandwidth data paths, and DEC, with its networking focus, must be prepared to support that new path, he adds.

On the applications level, possible products might include gateways between Ethernet and ISDN networks. But like most of the other major computer vendors, DEC has been participating in ISDN development for years, and products "are not that difficult to develop," Sudan says. "We have experience in ISDN technology. . . . We know basically what needs to be done, and we have done it." •

Unlock Programmer Productivity



With System 1032 Application Facility

System 1032/AF automatically generates most of your application code from menu selections. Yet you can add custom procedures wherever you need something special.

CompuServe
Data Technologies
Tel: (617) 661-9440
DEXPO Booth 1236
Circle Reader Service Number 9

Falotti Predicts DEC Surge in Europe

BY AMIEL KORNEL
IDG NEWS SERVICE

CANNES, France — Pier Carlo Falotti, head of Digital's European operations, kept a low profile earlier last month at Decworld '88, the glitzy promotional event staged here for the company's clients. Falotti let the limelight shine on the firm's senior U.S. officials. He gave no major presentations, met with few journalists and reportedly flew back to DEC's European headquarters in Geneva after only a couple of days at the show.

Falotti's discreet presence belied the growing importance of DEC's European business. In fact, Europe looms as DEC's main battleground of the '90s. The company's success or failure during the next decade could depend on how well it shifts power to European officers like Falotti.

"Opportunities here are probably better today than in the U.S.," Falotti said in an exclusive interview.

Seizing those opportunities will not be easy. With overseas market growth outpacing that in the U.S., the company must adapt its strategy, organization and culture to a global business environment.

For the first time, foreign sales outstripped U.S. sales during the last quarter of fiscal 1988, accounting for 52% of total revenue. The trend is expected to continue, says Mark Steinkrauss, DEC's director of investor relations. "At the end of fiscal '89, I fully expect non-U.S. revenues to exceed U.S. revenues," he said.

In fiscal 1988, DEC posted European revenue of $4.2 billion, or 37% of total corporate sales. Falotti projected that fiscal 1989 sales in Europe would grow at a rate "close to, but a little bit less than, last year."

The surge in overseas sales at DEC, as for most major U.S. vendors, can largely be attributed to European business' efforts to close a gap in computerization with their U.S. rivals. Growth will probably accelerate further as Europe completes plans by 1992 to do away with internal trade barriers, creating a single open market of 320 million people, about 50% bigger than the U.S. "The resulting marketplace could eclipse those of the U.S. and Japanese markets," says Peter Smith, DEC's U.S.-based vice-president for product marketing.

Falotti notes, for example, that a more open market forces international firms to even out disparities in cost structure and pricing across national borders. This pricing change is one of the things than can best be done by giving the European headquarters in Geneva greater authority, he and analysts agree.

European users may not look favorably on a concentration of power at the European level. "I would be concerned with a centralization in Europe," says Arrick Wilkinson, director of the computing center at the Dundee College of Technology in Dundee, Scotland, a large DEC site. "You need a degree of local flexibility."

The rising importance of the European market also means DEC must shift more management focus — and power — from the U.S. to Europe. That won't be easy. "It is going to cause tremendous culture shock that the European revenues exceed U.S. business," says Philippe de Marcillac, computer industry analyst at Dataquest Ltd. in London. "It calls for a fundamental shift in power, and it will be very hard to do. U.S. companies aren't used to letting go in Europe."

DEC may need to increase local manufacturing. Only 40% of the manufacturing content of goods currently sold by DEC in Europe is made here, says Colin Allen, director of government and institutional programs at DEC Europe. This compares rather unfavorably with the 90% local-content claims made by IBM in Europe.

According to DEC France spokesman Marc Armand, DEC aims eventually to have all products sold in Europe manufactured here. He pointed out that DEC has invested about $150 million in a new very large-scale integration plant currently under construction in Edinburgh, Scotland.

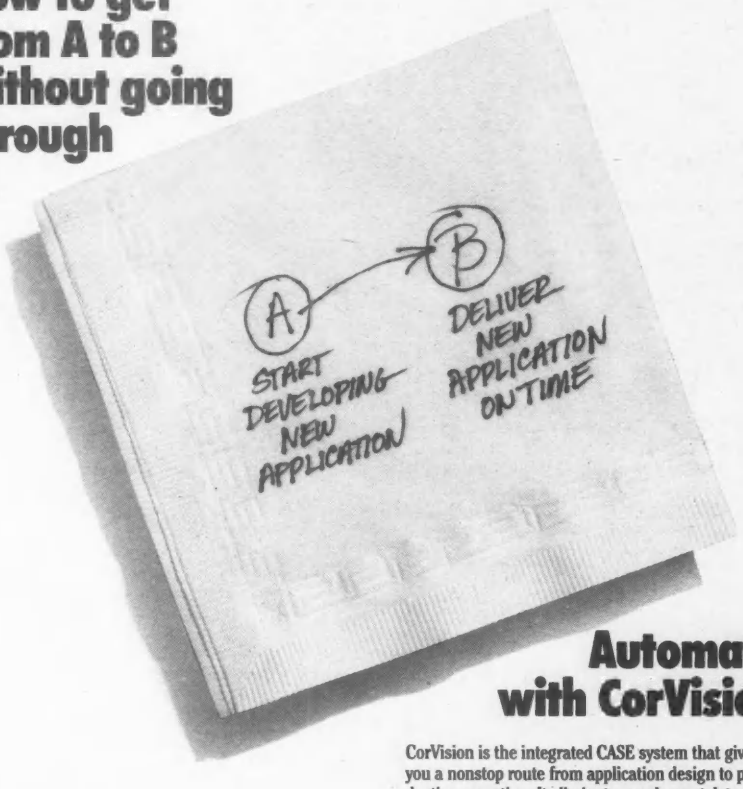
Product development and engineering is another area likely to be beefed up in Europe as the market here grows. DEC's European users are eager to see this happen. Wilkinson, formally chairman of the Digital Equipment Computer Users Society, or DECUS, in Europe, says having DEC product development teams based in Europe would mean faster response to users' software performance complaints.

DEC's European operations already have had a strong influence on product directions in the company. Engineers at centers in France, for example, have been responsible for developing hardware for the firm's X.25 communications products, a private branch exchange terminal server and the redundant Microvax II.

Insiders confirm that Europe's influence on corporate strategy is already significant. "What's being embraced in Europe," says Patricia Meagher Davis, analyst at London stock brokerage James Capel & Co., "is having an impact on what's embraced in the U.S." That foreign voice is sure to continue being heard in faraway Maynard as the company steers a course to the '90s. ■

Kornel is IDG News Service's European bureau chief.

How to get from A to B without going through H.



Automate with CorVision.

CorVision is the integrated CASE system that gives you a nonstop route from application design to production operation. It eliminates unpleasant detours—like missed deadlines, unmet user requirements and budget overruns—that are often unavoidable when using conventional development methods and programming tools.

CorVision is the fastest, safest, most direct route to application development success. It automates more stages of the application software life cycle than any other development system for Digital VAX computers. From application design—using entity relationship diagramming and screen painting tools—to automatic code generation, source documentation, testing and maintenance, CorVision will increase overall development productivity by as much as 6:1.

If you're looking for the best way to shorten the distance between A and B, we urge you to test drive CorVision. Call or write today for more information.

CORTEX

Cortex Corporation, 138 Technology Drive
Waltham, MA 02154 (617) 894-7000

Circle Reader Service Number 10

Products

BY SUSAN GRECO

Charting the Changes

DEC has introduced more than 70 products — including dozens of crucial upgrades — since the publication of the last Computerworld Extra *on DEC in September 1987. The information was gleaned from computer analysts, DEC press releases and published news reports. The following is a list of selected products and their current status.*

** Indicates the starting price of a product.*

Note: Some prices may be 8% to 13% higher because of the DRAM shortage.

SEPTEMBER 1987

Product name: Microvax 3500, 3600
Price: $74,900-$180,000
Specifications: 3 MIPS; CMOS chip set; 16M-32M bytes of memory; 27-in. pedestal (3500) or 41-in. cabinet (3600); 280M-byte RA70 (3500); 622M-byte RA81/RA82 (3600).
Introduced: Sept. 9, 1987
Ship date: December 1987
Initial outlook: DEC says the models expand Microvax range on high end well beyond IBM's 9370 Model 60.
Current status: Microvax/Vaxstation 3500 shipped in April '88 due to problems with RA70; 3600 starting shipping in January '89, while the 3200 left the dock in February '88. Still backlogged two to four months. So far, though, the Microvax/Vaxstation 3000 series is selling well to the installed base, says Shao Wang, an analyst with Smith Barney, Harris Upham & Co.

Product name: Vaxstation 3200, 3500
Price: $19,900*
Specifications: 3 MIPS; CMOS chip set; 8M-32M bytes of memory; RD54 (3200); RA70 (3500).
Introduced: Sept. 9, 1987
Ship date: December 1987
Initial outlook: High-end workstations for CAD, CASE, AI applications; triples performance of Vaxstation 2000.
Current status: See "current status" above. Models face stiff competition from high-end offerings sold by Apollo Computer, Inc., Sun Microsystems, Inc., Hewlett-Packard Co. and Silicon Graphics, Inc. — where you'll likely find some better price/performance buys than the 3200/3500, says Sandra Gant, an analyst at Infocorp.

Product name: Decnet System Services
Price: $250-$14,400 (software sold separately)
Specifications: Includes VAX Distributed File Service, VAX Distributed Queuing Service and VAX Distributed Name Service; layered on top of Decnet software.
Introduced: Sept. 9, 1987
Ship date: October-November 1987
Initial outlook: Initial versions of three utilities for accessing distributed information and peripherals as if from a single system.
Current status: Important set of software tools for building large networks, according to Frank Dzubeck, president of Communications Network Architects, Inc.

OCTOBER 1987

Product name: VIDA With IDMS/R 2.0
Price: $5,250-$52,500
Specifications: Supports DOS/VSE; translates VAX user requests for compatibility with Cullinet IDB software.
Introduced: Oct. 21, 1987
Ship date: Fall 1987
Initial outlook: Provides automatic network linking of IBM data files and VAX system applications.
Current status: Updated and integrated into DEC's new transaction processing environment, DECTP, introduced July 19, 1988.

NOVEMBER 1987

Product name: VAX PHIGS 1.0
Price: $3,500
Specifications: Device-dependent; functions for depth queuing, shading and hidden line/hidden surface removal.
Introduced: Nov. 30, 1987
Ship date: March 1988
Initial outlook: A wise move to support the ANSI PHIGS standard, says Lew Brentano, Infocorp vice-president for the technical systems group.
Current status: Made it possible to port a host of software quickly and easily to the Vaxstation 8000 when it was introduced in February 1988.

DECEMBER 1987

Product name: VAX ELN 3.0
Price: $1,470-$14,600
Specifications: Support for Microvax 3500/3600, VAX 8800; tool kit enhancements include error logging and extended ANSI/ISO Pascal compiler.
Introduced: Dec. 7, 1987
Ship date: January 1988
Initial outlook: Complements and extends VMS software for real-time computing.
Current status: Upgraded May 9, 1988.

JANUARY 1988

Product name: Network Applications Support
Price: Not applicable
Specifications: Will include OS/2 interfaces to Decnet. Protocol support for Data Access Protocol, a Decnet protocol for files since 1975; Microsoft's Server Message Block; Sun's Network File System; Apple Computer, Inc.'s AFP file-sharing protocol; Adobe Systems, Inc.'s Postscript; Digital Document Interchange Format; and SQL.
Introduced: Jan. 19, 1988
Ship date: Not announced.
Initial outlook: A plan to integrate IBM, DEC/Unix, Apple machines with VAX/VMS systems. DEC called it a "strategic briefing," but angry analysts called it vaporware and worse. Not much in the face of IBM's earlier SAA announcement.
Current status: According to Dzubeck, still a structure, not a robust architecture. DEC is delivering one piece — like Decwindows — at a time, which is almost worse than delivering nothing at all, he says. "It's an aggressive concept," comments Marty Gruhn of The Sierra Group. "They're inching forward, but it's painful."

FEBRUARY 1988

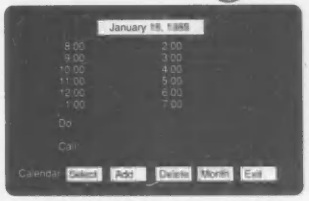
Product name: Vaxstation 8000
Price: $87,710
Specifications: Multiprocessing; Vaxbi bus and proprietary graphics bus; 8250 processor, 3 Microvax II processors; 5,000 smooth-shaded polygon/sec.; 8,000- by 6,000-pixel resolution; 19-in. screen; X Windows Version 11.
Introduced: Feb. 2, 1988
Ship date: March 1988
Initial outlook: High end of Vaxstation family; DEC's first 3-D graphics machine; competes with systems manufactured by Silicon Graphics, HP, Apollo and Sun.
Current status: This high-end workstation has earned engineers' praise, but according to John Logan, vice-president of the Aberdeen Group, it isn't really a 3-D machine. The 8000 is good for surface modeling, he says, but fails to compete with solid-modeling workstations from companies like Stellar Computer Co. and Ardent (which are also much higher priced). Stay tuned for an upgrade from the 8250 to, perhaps, the 6200 box, analysts say.

MARCH 1988

Product name: VAX 8810, 8820, 8830, 8840
Price: $543,900-$1.7 million and up
Specifications: 6 to 22 MIPS; symmetrical multiprocessing; 8700 uniprocessor; 48M to 512M bytes of memory; 8820 cluster available (8842).
Introduced: March 8, 1988
Ship date: March 8, 1988
Initial outlook: With introduction of symmetrical multiprocessing, extends performance of 8800 and challenges lower end of IBM's 3090 mainframe line, DEC says.
Current status: Basically a "glorified Vaxcluster," says Smith Barney's Wang, who adds that the series does not compete directly with IBM's 3090 line. For users who need more MIPS,

Greco is a Boston-based free-lance writer and editor.

Unlock M.I.S. Backlogs



With System 1032 Application Facility

One keystroke builds a standard application from any System 1032 database you indicate. You then extend this prototype into a full-fledged system by filling in specification menus.

CompuServe
Data Technologies
Tel: (617) 661-9440
DEXPO Booth 1236

Circle Reader Service Number 11

especially in the scientific/engineering world, the 8800 series is great, Logan says. Expect to see a replacement product in 25- to 30-MIPS range in the second half of 1989, Rich Schreiber, vice-president of systems research at International Data Corp. (IDC), predicts.

APRIL 1988

Product name: RV20 WORM drive
Price: $30,000*
Specifications: 2G bytes on 12-in. platter.
Introduced: April 5, 1988
Ship date: May 1988
Initial outlook: DEC's first foray into the optical market.
Current status: Emulates tape systems; not a terribly exciting product, IDC's Dave Vellante says. WORM drive is an experiment for Digital, simply the tip of the iceberg. He predicts the multiple drive jukebox won't be out for a while because the software that controls it is "a nightmare." While there are some uses for write-once drives, the market is really waiting for erasable drives, says Jim Porter, president of Disk/Trend, Inc.

Product name: VAX 6210, 6220, 6230, 6240
Price: $131,600-$653,200
Specifications: 2.8-11 MIPS; CMOS chip set; VMS 5.0; first to combine symmetrical multiprocessing with high-speed VAXBI bus; 32M to 256M bytes memory; modular upgrade path provided to 6240.
Introduced: April 19, 1988
Ship date: April 19, 1988
Initial outlook: Refreshes the 8000 line while adding better price/performance. First use of 100M byte/sec. XMI bus; general-purpose, enterprisewide system that DEC claims matches performance of IBM 4381 Model 25, at prices comparable to 9370 Model 90.
Current status: The hot new machine in the mid-range to high end, with sales of more than 500 in first three months, according to DEC.

The 6200 will play an important role in OLTP sales, where DEC will go head-to-head with IBM's AS/400 for the lucrative mid-range new account market.

Product name: VMS 5.0
Price: $910*
Specifications: Symmetrical multiprocesing; merges MicroVMS; faster processing throughput; LAVC and Vaxcluster systems appear as single system; international conversion feature.
Introduced: April 19, 1988
Ship date: Summer 1988
Initial outlook: Long-awaited and crucial to DEC's OLTP strategy.
Current status: In fact, VMS 5.0 is more than 50% of DEC's new transaction processing solution, Aberdeen's Logan says. Delivers all the functionality expected, but VMS still needs more capabilities in areas such as accounting and business applications, he notes.

MAY 1988

Product name: RTVAX 3200, 3500, 3600
Price: $18,950-$65,000
Specifications: Three times the performance of Microvax II; 8M to 32M bytes of memory; 318M-2.5G bytes disk storage; VAX ELN bundled in.
Introduced: May 9, 1988
Ship date: June 1988
Initial outlook: Fills out real-time offerings in the mid-range between RTVAX 1000 and VAX 8000; accompanied by price reductions on low end, including RTVAX 1000 and IVAX 620.
Current status: "DEC has nothing to apologize for," Logan says. In terms of MIPS, throughput and shared memory, the new real-time offerings compete head on with systems from Concurrent Computer Corp., Masscomp Co., Gould, Inc. and others. DEC is clearly dedicated to real time, he says.

Product name: Decnet for PCs 2.0
Price: $350
Specifications: Support for new PC configurations; task-to- task communications; terminal emulation; file transfer.
Introduced: May 17, 1988
Ship date: May 17, 1988
Initial outlook: Latest version of must-have PC integration product.
Current status: Continuing its PC integration strategy, DEC announced it will also provide support for Apple computers but will handle that through OSI. Look for DEC's Apple products next summer or sooner.

JUNE 1988

Product name: Decnet/SNA MS-DOS 3270 Terminal Emulator
Price: $199
Specifications: Emulation of IBM 3278, 3279 (text only), 3178 and 3180 terminals; same interface as VMS 3270 Terminal Emulator; operates directly with Decnet/SNA Gateway.
Introduced: June 21, 1988
Ship date: June 21, 1988
Initial outlook: Enhances DEC's Network Application Support capabilities; provides direct access to IBM hosts; users no longer have to perform multiple types of emulation.
Current status: A step toward greater DEC-IBM integration but clearly not enough, says the Sierra Group's Gruhn. To some extent, replaced by more powerful connectivity products announced Aug. 23.

JULY 1988

Product name: Decintact 1.0
Price: $4,457-$141,135
Specifications: Transaction processing monitor and software under VMS; over

EXCLUSIVE FROM MILTOPE!
Continuous Printing at 37/90 Pages per Minute
Cut sheet printers available at 30/60/75 ppm
"WE CONNECT TO DEC"

Miltope's FAMILY of Non-Impact 'ion' deposition page printers affords letter quality printing at 'less than a penny' per page.

Miltope provides multifont alpha/numeric printout, "true" electronic forms overlay plus sophisticated graphics for generation of signatures, logos, bar codes, OCR and special characters.

Miltope's page printers eliminate time-consuming bottlenecks by combining speed, high-duty cycle, reliability and versatility in electronic printing systems that are plug-to-plug compatible and fully emulate:

- Xerox 3700/2700
- HP LaserJet Plus
- HPGL
- HASP
- QMS MAGNUM (Printronix Graphics)
- IBM Interfaces: 3211 — 3287 — System 3X — AS/400 2780/3780 — 3270 — 3770 etc.
- Dataproducts or Centronics Interface
- Mini/Super-Mini Interface (i.e., DEC, DG, Wang, Unisys, etc.)

The choice is YOURS!

MODEL	SPEED	FORMAT	RESOLUTION	MONTHLY VOLUME
3801	90 PPM	Continuous Form	240 x 240 DPI	Over 1 Million Pages
SERIES 75	75 PPM	Cut Sheet	240 x 240 DPI	Up to 1 Million Pages
SERIES 60	60 PPM	Cut Sheet	240 x 240 DPI	Up to 1 Million Pages
SERIES 37	37 PPM	Continuous Form	300 x 300 DPI	Over 250,000 Pages
SERIES 30	30 PPM	Cut Sheet	300 x 300 DPI	Up to 250,000 Pages

Cost Effective Printing and Dependable Nationwide Field Service have made Miltope the "Source" for ALL ion deposition printing systems.

"IMAGINE YOUR IMAGE"

MILTOPE Business Products, Inc.
1770 WALT WHITMAN ROAD • MELVILLE, NY 11747
TEL: 516-756-7650 • TWX: 510-221-1803 • FAX 516-756-7606

Miltope Printers use Delphax ion deposition engines.

QMS and MAGNUM are registered trademarks of QMS, Inc.

Circle Reader Service Number 12

DEC VIEW

BY GLENN RIFKIN
CW STAFF

As vice-president of product marketing, Peter Smith has grown weary of the often-heard observation that DEC is not a marketing organization. "We overdo the polarization between marketing and engineering," Smith laments. "That's not the right way to put it. As engineering becomes more and more customer-related, we've moved everyone in the company more toward marketing."

Smith acknowledges that focusing on engineering was paramount throughout most of the years since he joined the company in 1970. However, since the company's 1982-'83 reorganization, he believes, "a customer mentality has been embedded in the company."

He points to Decworld as the quintessential marketing scheme — an event that last year brought the company as much as $2 billion in business. "To me, that's marketing," Smith says. "I suppose it wouldn't be if your definition of marketing is huckstering a product."

At 43, Smith oversees nearly 2,000 people and is responsible for product application solutions and strategy focus in engineering, manufacturing, laboratory data products, science and the office.

Like other DEC leaders, Smith continuously pushes the company's message of integrating applications and solutions for customers. He believes his group epitomizes the mix of marketing and engineering that will characterize the DEC of the '90s.

"Our ability to adapt to change reflects the way Ken Olsen looks across the dimensions."

Peter Smith
Vice-President
Product Marketing

"Half of our capability is product marketing; the other half is engineering products," he comments. "This is clearly a strategic direction in terms of products and applications."

Smith helped pioneer DEC's successful cooperative marketing partner program and is an active booster of outside resources for providing customer applications.

Smith credits President Ken Olsen with setting the tone that allowed the company to respond to the various waves of focus — first hardware, then systems, then networking and now software — so quickly. "Our ability to adapt to change reflects the way Ken Olsen looks across the dimensions," Smith says. "We're constantly ready for technological change, and we tend to move relatively quickly."

Noting that DEC has recently brought thousands of new employees from other cultures, Smith points out that the new faces can add value but must remember and understand that the processes that made DEC successful must continue.

"When you pick the right people, they get integrated quickly," he says. "The bigger challenge is to make that individual feel good, to recognize that they had success in another culture and must be set up to feel they can make an impact here."

100 transaction/sec. on single system; supports RMS; supports VT100, 200, 300 series.
Introduced: July 19, 1988
Ship date: July 19, 1988
Initial outlook: Crux of DECTP program. New offerings and strategy should make DEC a true contender in this market. "At least now they have a fighting chance," says Greg Cline, a senior analyst at the Yankee Group.
Product name: SA600 Storage Array
Price: $125,000; $225,000
Specifications: 4-8 RA90s; 4.8G or 9.7G bytes; volume shadowing; linear density of 40 million bits per sq in.; average seek time of 17.5 msec
Introduced: July 19, 1988
Ship date: July 19, 1988
Initial outlook: SA600 and RA90 anticipated for two years; indispensable component of DEC OLTP solution.
Current status: DEC has delivered several hundred units, and robots are starting to assemble the RA90 drive. Not cheap, but addresses issues of reliability, performance and gigabytes per port, IDC's Vellante says.

Product name: VAX RDB/VMS 3.0
Price: $2,250-$71,250
Specifications: 30 transaction/sec. on VAX 8800; on-line backup; incorporates SQL 2.0; can support databases as large as 50G bytes.
Introduced: July 19, 1988
Ship date: July 19, 1988
Initial outlook: In the past, VAX RDB/VMS has done OK against Relational Technology, Inc.'s Ingres and Oracle Corp.'s Oracle. But the product has been hampered by low speeds and a lack of customer support, Logan says.

Product name: VAX DBMS 4.0
Price: $3,150-$99,750
Specifications: High-speed data backup; Codasyl-compliant.
Introduced: July 19, 1988
Ship date: July 19, 1988
Initial outlook: Although RDB/VMS naturally overwhelmingly outsells DBMS, DEC will no doubt continue to make minor upgrades like this one for the installed base. "Sooner or later, DEC will only support DBMS," IDC's Schreiber says.

Product name: VAX TDMS 1.8
Price: $620-$14,870
Specifications: DECTP integration; screen editor lets users define forms locally to format data on their terminals; record-level programming interface; fully compatible with ACMS.
Introduced: July 19, 1988
Ship date: July 19, 1988
Initial outlook: Latest version of system that separates forms data from applications code.

Product name: VIDA With IDMS/R 2.1
Price: $2,760-$87,280
Specifications: Supports DOS/VSE; automatic login to IBM systems; user requests compatible with Cullinet IDB software.
Introduced: July 19, 1988
Ship date: August 1988
Initial outlook: Provides automatic network linking of IBM data files and VAX system applications, including IBM mainframe files with the VAX transaction processing market.
Current status: Minor upgrade to support DECTP.

AUGUST 1988

Product name: Decnet/SNA Gateway for Channel Transport
Price: $44,500
Specifications: Higher bandwidth; improved throughput using DEC Channelserver; supports up to 25 concurrent sessions; provides SNA connectivity to any Phase IV or Phase IV+ Decnet system in the Decnet network.
Introduced: Aug. 23, 1988
Ship date: September 1988
Initial outlook: Provides bidirectional exchange of data and resources between Decnet, SNA environments; access to IBM applications; acts as 3270 Display Terminal.

Product name: VMS/SNA 1.3
Price: $630-$17,290
Specifications: Supports 3270 terminal emulation, IBM Distributed Office Support, or Dissoss, document exchange, Application Programming Interface, Printer Emulation, Remote Job Entry, APPC/LU6.2 and 3270 Data Stream.
Introduced: Aug. 23, 1988
Ship date: September 1988
Initial outlook: VAX/VMS systems can now directly participate in an IBM SNA environment. Users can exchange files, data files and documents with an IBM host, as well as implement distributed application programs that run between the VMS and IBM systems. Also serves as transport base for other IBM-related capabilities (see specifications).

Product name: Ultrix-32 3.0
Price: $2,100-$56,058
Specifications: Complies with Posix, OSF Application Environment Specification Level 0, X/Open, X Window System; support for 6210/6220, 8810/8820.
Introduced: Aug. 23, 1988
Ship date: Fall 1988
Initial outlook: Major release that DEC says complies with all major industry standards. The key here is Posix, which is now essential to federal sales, according to Dzubeck. Without Posix, DEC was facing a real marketing problem in the government market, in which it's a major player.

Product name: Decnet-Ultrix 3.0
Price: $525-$9,870
Specifications: Task-to-task communications; network virtual terminal; remote file transfer.
Introduced: Aug. 23, 1988
Ship date: Fall 1988
Initial outlook: Functions as a gateway between Decnet/OSI and TCP/IP-based networks. A migration strategy that is much different than Hewlett-Packard Co.'s and not as good, Dzubeck comments. In fact, what DEC is saying here is, "We don't want you to use TCP/IP," he adds.

Product name: VMS/Ultrix Connection
Price: $7,500-$126,000
Specifications: Supports TCP/IP, uses Datagram Protocol, Address Resolution Protocol, File Transfer Protocol
Introduced: Aug. 23, 1988
Ship date: Fall 1988
Initial outlook: Provides VMS services, such as shadowing, to Unix workstations. "What they're trying to do is break down the barriers, so the two worlds can work together," Dzubeck says. Interoperability is the word of the day, he adds. •

Unlock VAX Resources

With System 1032 Application Facility

System 1032/AF integrates everything on your VAX: VMS services, 4GL, existing 3GL modules. Integrate at the menu level or invisibly weave everything together inside an application.

CompuServe

Data Technologies
Tel: (617) 661-9440
DEXPO Booth 1236

Circle Reader Service Number 13

The Bottom Line

BY JEAN ORR

A Slow, Steady Climb

Can DEC continue to grow faster than the industry, as it has for almost 25 years?

The answer is yes. But the rate of gain will not equal past performance. In the 1970s, DEC's revenue grew an average of 35% per year; industry revenues increased an average of 20% during the period. So far in the 1980s, industry revenues have increased at an average rate of 13% per year, compared with Digital's 23%.

DEC has achieved these growth rates by increasing its share of market in each of these periods. The company gained share because it responded better than others to customer computing requirements and because it moved aggressively to meet that demand.

Industry growth through the first half of the 1990s is expected to be 9% or 10%. If this figure is right, DEC will probably grow 15% to 17% per year and will attain revenue of $26 billion to $30 billion by 1995.

The reasons DEC may do so well are both internal and external. Its basic architecture is well established, and the technology to continue its development into the early 1990s is clearly visible even now. The range of products and markets is broad, and credibility with customers has never been higher.

Externally, the slower industry growth rate has made customers more cautious in dealing with second-tier vendors and more anxious to reduce the number of suppliers. Today, DEC sits high on most corporate buy lists.

DEC's remarkable growth rate has not been without fluctuations. In 1981, revenue jumped more than 35%; in 1983, it increased just more than 10%. Revenue in 1988 was up more than 22%, but expectations are that in fiscal 1989, revenue growth will fall to about 15%. Much of the variation over time is attributable to product cycles for the company and, to a lesser extent, the macroeconomy.

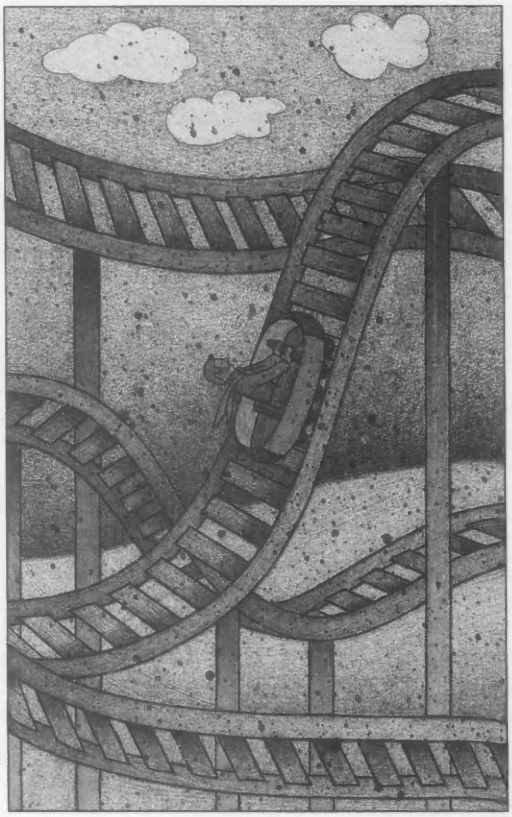
Along with the variability in the growth of its revenue, Digital has recorded significant swings in profitability and income during the history of the company. In the past five years, for example, the quarterly operating profit margin has been as low as 5.2% (in the fourth quarter of fiscal 1985) and as high as 18.5% (in the fourth quarter of fiscal 1987). Return on equity was 17.2% in fiscal 1978, hit a low of 8.4% in fiscal 1983 and reached a record high of 19.1% in 1987.

The company has modified its management policies to take fluctuations in revenue growth into consideration, however. Planning processes have improved, and operations are more businesslike. Most important, as an industry leader, DEC has much greater control over its selling today than in the past.

A year ago, when management perceived that revenue growth would be lower than planned, cost control measures were instituted to keep expense growth closer to revenue growth. The company will continue to hone its skills in this area and thus avoid the extreme swings in profit of earlier years.

Digital should grow faster than the industry, and the industry should grow faster than the economy through the mid-1990s. DEC has the management and the assets to achieve this growth. Although there will be some fluctuation in results quarter to quarter and year to year, the net result will be superior growth over time. ●

Orr is an investment consultant in the technology industry based in New York.



DAN COLLINS

DEC Stock Always a Thrill Ride

DEC's stock has always been volatile, moving significantly more than the market in general, both up and down. Companies showing high growth tend to be more volatile, and DEC is no exception.

Brad Allen, an investor relations specialist at DEC, says that despite its size, DEC continues to grow rapidly — acting almost like a smaller, less stable firm in the eyes of the investor community.

DEC has never paid a dividend, either, and it has no immediate plans to change that policy. This causes investors to view the stock as more risky.

But external factors alone cannot be blamed for the rollercoaster performance of DEC's stock. Ken Olsen is willing to take the hard hits of earnings volatility in the short term.

Some of the stock's fluctuations result from poor quarterly performances or problems in the product lines.

Whatever the reasons, DEC's stock has taken a hard bounce in the year since the crash, plummeting to the $90-per-share level from nearly $200.

Wall Street analysts have expressed uncertainty about DEC and its rapid expansion in the past few years. Many have taken DEC off the "buy" list.

The company, however, boasts a Triple A rating and is considered one of the five best managed companies in the country, according to a recent survey by *Pension and Investment Age* magazine.

GEORGE HARRAR

Pass along readers, unite!

Demand your own copy of Computerworld.

YES, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $44* per year — saving over 56% off the single copy price. In addition, as a subscriber, I understand I will receive bonus issues of COMPUTERWORLD FOCUS at no extra charge.

First Name MI Last Name

Title Company

Address

City State Zip

Address Shown: ☐ Home ☐ Business Single Copy Price: $2.00

* U.S. Only. Canada, Central America & South America $110/Europe $165. All countries $245 (Airmail). Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

1. **BUSINESS/INDUSTRY** (Circle one)
   - 10. Manufacturer (other than computer)
   - 20. Finance/Insurance/Real Estate
   - 30. Medicine/Law/Education
   - 40. Wholesale/Retail/Trade
   - 50. Business Service (except DP)
   - 60. Government — State/Federal/Local
   - 65. Communications Systems/Public Utilities/ Transportation
   - 70. Mining/Construction/Petroleum/Refining/Agric.
   - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85. Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
   - 90. Computer/Peripheral Dealer/Distributor/Retailer
   - 75. User: Other _____
   - 95. Vendor: Other _____ (Please specify)
2. **TITLE/FUNCTION** (Circle one)
   - **IS/MIS/DP MANAGEMENT**
   - 19. Vice President, Asst. VP
   - 21. Dir., Mgr., Suprv., IS/MIS/DP Services
   - 22. Dir., Mgr., Suprv., of Operations, Planning, Adm. Services
   - 23. Dir., Mgr., Suprv., Analyst, of Systems
   - 31. Dir., Mgr., Suprv., of Programming
   - 32. Programmer, Methods Analyst
   - 35. Dir., Mgr., Suprv., OA/WP
   - 38. Data Comm. Network/Systems Mgt.
   - **OTHER COMPANY MANAGEMENT**
   - 11. President, Owner/Partner, General Mgr.
   - 12. Vice President/Asst. VP
   - 13. Treasurer, Controller, Financial Officer
   - 41. Engineering, Scientific, R&D, Tech. Mgt.
   - 51. Sales/Mktg. Mgt.
   - **OTHER PROFESSIONALS**
   - 60. Consulting Mgt.
   - 70. Medical, Legal, Accounting Mgt.
   - 80. Educators, Journalists, Librarians, Students
   - 90. Others _____ (Please specify)
3. **COMPUTER INVOLVEMENT** (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant
   - A. Mainframes/Supermins
   - B. Minicomputers/Small Business Computers
   - C. Microcomputers/Desktops
   - D. Communications Systems
   - E. Office Automation Systems
   - F. No Computer Involvement

E480X-7

Pass along readers, unite!

Demand your own copy of Computerworld.

YES, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $44* per year — saving over 56% off the single copy price. In addition, as a subscriber, I understand I will receive bonus issues of COMPUTERWORLD FOCUS at no extra charge.

First Name MI Last Name

Title Company

Address

City State Zip

Address Shown: ☐ Home ☐ Business Single Copy Price: $2.00

* U.S. Only. Canada, Central America & South America $110/Europe $165. All countries $245 (Airmail). Foreign orders must be prepaid in U.S. dollars.

Please complete the information to the right to qualify for this special rate.

COMPUTERWORLD

1. BUSINESS/INDUSTRY (Circle one)
   - 10. Manufacturer (other than computer)
   - 20. Finance/Insurance/Real Estate
   - 30. Medicine/Law/Education
   - 40. Wholesale/Retail/Trade
   - 50. Business Service (except DP)
   - 60. Government — State/Federal/Local
   - 65. Communications Systems/Public Utilities/ Transportation
   - 70. Mining/Construction/Petroleum/Refining/Agric.
   - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85. Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
   - 90. Computer/Peripheral Dealer/Distributor/Retailer
   - 75. User: Other _____
   - 95. Vendor: Other _____ (Please specify)
2. TITLE/FUNCTION (Circle one)
   - IS/MIS/DP MANAGEMENT
   - 19. Vice President, Asst. VP
   - 21. Dir., Mgr., Suprv., IS/MIS/DP Services
   - 22. Dir., Mgr., Suprv., of Operations, Planning, Adm. Services
   - 23. Dir., Mgr., Suprv., Analyst, of Systems
   - 31. Dir., Mgr., Suprv., of Programming
   - 32. Programmer, Methods Analyst
   - 35. Dir., Mgr., Suprv., OA/WP
   - 38. Data Comm. Network/Systems Mgt.
   - OTHER COMPANY MANAGEMENT
   - 11. President, Owner/Partner, General Mgr.
   - 12. Vice President/Asst. VP
   - 13. Treasurer, Controller, Financial Officer
   - 41. Engineering, Scientific, R&D, Tech. Mgt.
   - 51. Sales/Mktg. Mgt.
   - OTHER PROFESSIONALS
   - 60. Consulting Mgt.
   - 70. Medical, Legal, Accounting Mgt.
   - 80. Educators, Journalists, Librarians, Students
   - 90. Others _____ (Please specify)
3. COMPUTER INVOLVEMENT (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant
   - A. Mainframes/Supermins
   - B. Minicomputers/Small Business Computers
   - C. Microcomputers/Desktops
   - D. Communications Systems
   - E. Office Automation Systems
   - F. No Computer Involvement

E480X-7

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144

HAVE WE GOT NEWS FOR YOU!

Extra! Extra! Read all about it — in COMPUTERWORLD, the newsweekly for the total systems perspective. You need the most up-to-the-minute news. Hot off the presses. While you can still use it. Not a week or two later.

And COMPUTERWORLD delivers — right to your desk.

We keep you on top of all the latest news, products, people, developments, trends and issues — things professionals like you need to know to get ahead. And stay there.

More good news.

SPOTLIGHT, a regular section within COMPUTERWORLD, details a single product category — LANs, printers, financial software, security products, graphics workstations, and more. Each SPOTLIGHT includes surveys of key vendors and head-to-head product comparisons with an at-a-glance ratings chart.

Get your own copy.

You can't afford to wait for the hottest news in the business. Get your own copy of COMPUTERWORLD. 51 information-packed issues. All backed by our no-questions-asked Money Back Guarantee.

FREE bonus issues of COMPUTERWORLD FOCUS.

Order now and you'll also receive bonus issues of COMPUTERWORLD FOCUS, each one dealing in-depth with a single vital topic — Connectivity, PC's, Communications, Data Security, and more. All FREE and ONLY for COMPUTERWORLD subscribers.

Order Now. Use the postage paid subscription card bound into this issue to get your own copy of COMPUTERWORLD.

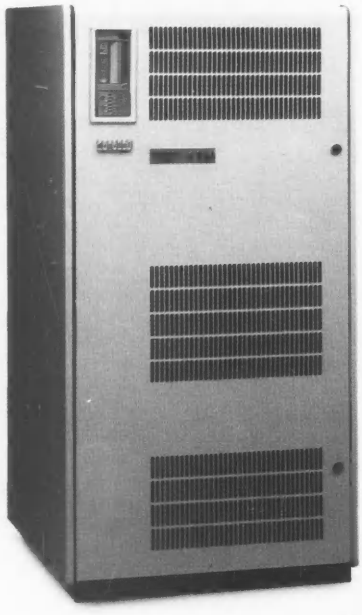
And get the late-breaking news — before it's too late.

COMPUTERWORLD

375 Cochituate Road, Framingham, MA 01701

Windows open to 80386 power
High-octane Microvaxes roll
Lack of unity endangers the promise of DAT
BY JAMES A. MARTIN
Unisys adds 1100/90 models
Storage Tech boosts solid-state
AT&T spells out net control
Codex reveals net manage
DB2 advantages require
Wang takes Ethernet plunge
NEC releases hard-disk Multispeed lapto
Broker workstation tools
MAP users group lays down law
Hot future for DP pros
IBM slow to reme
DB2 security

Millennium from McCormack & Dodge. Digital has it now.



When we introduced Millennium® to the software industry, it was widely hailed as the world's first truly integrated processing environment.

A technology so advanced, Millennium gave users the long-awaited power to move easily from one business application to another through a common interface. For the most efficient use of a company's data processing resources, and the people who work with them.

Now, M&D achieves another breakthrough. By bringing Millennium's borderless technology to the full range of Digital VAX machines. And with it, the means to update, manage and process information on the VAX as never before.

Each Millennium application comes with a set of shared features. Such as query, HELP, screen design and multiple navigation methods. So users trained on one system inherently know how to obtain information from all of them.

In addition, every Millennium application runs on a variety of hardware platforms. Which means the software you use on VAX machines in divisional offices, for example, can be the same as that running on your corporate IBM mainframe. A feature that lets you realize the enormous potential of distributed software strategies.

What's more, Millennium works with Digital layered products like Datatrieve,™ the ALL-IN-1™ business and office automation system, and VAX VTX,™ a videotex application.

In short, M&D will take your business a Millennium ahead. To find out more, call us at 1-800-343-0325.

McCormack & Dodge

a company of The Dun & Bradstreet Corporation

We put the customer in control of the software.

Circle Reader Service Number 2